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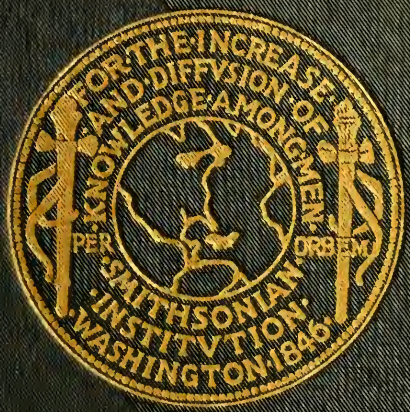

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SMITHSONIAN INSTITUTION
UNITED STATES NATIONAL MUSEUM
BULLETIN 161

THE FORAMINIFERA OF THE TROPICAL PACIFIC COLLECTIONS OF THE "ALBATROSS," 1899–1900

PART 3.—HETEROHELICIDAE AND BULIMINIDAE

BY

JOSEPH AUGUSTINE CUSHMAN

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THE FORAMINIFERA OF THE TROPICAL PACIFIC COLLECTIONS OF THE "ALBATROSS," 1899–1900

Part 3.—Heterohelicidae and Buliminidae

By Joseph Augustine Cushman

INTRODUCTION

This paper is the third part of a work the intent of which is to describe and illustrate the Foraminifera of the tropical Pacific collected by the United States Bureau of Fisheries steamer *Albatross*, together with certain other related material from shallow water of the same region. Part 4 will complete the work and will take up in systematic order the families beginning with the Rotaliidae. Readers are referred to Part 1, p. 3, for a map showing the general route of the *Albatross* through the South Pacific.

Some interesting relationships have been noted in these faunas in which are living representatives of species known hitherto only from the late Tertiary of other regions. The number of distinctive species in this area is large, which is not surprising when the remoteness from other shallow-water material is taken into consideration and also the very small amount of work that has been done on the deeper-water deposits of the Pacific region.

Table 1.—*Abbreviations used in the tables in this report to denote the character of the bottoms of the stations*

Abbreviation	Meaning	Abbreviation	Meaning	Abbreviation	Meaning
br	brown.	gy	gray.	pter	pteropods.
brk	broken.	lav	lava.	pum	pumice.
c	clay.	lt	light.	rd	red.
co	coral.	m	mud.	s	sand.
crs	coarse.	mang	manganese.	sh	shells.
fne	fine.	min	mineral.	vol	volcanic.
frag	fragments.	nod	nodules.	wh	white.
glob	globigerina.	oz	ooze.	yl	yellow.
gn	green.	part	particles.		

Family HETEROHELICIDAE

Subfamily BOLIVINITINAE

Genus BOLIVINITA Cushman, 1927

Bolivinita CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 2, pt. 4, p. 90, 1927.

Genoholotype.—Textularia quadrilatera Schwager.

Test with chambers biserial, periphery and broader sides all concave, with strongly developed angles giving a quadrate end view to the test; wall calcareous, perforate; aperture large, at base of inner margin in the median line. Upper Cretaceous to Recent.

BOLIVINITA QUADRILATERA (Schwager)

PLATE 1

Textularia quadrilatera SCHWAGER, *Novara*-Exped., Geol. Theil, vol. 2, p. 253, pl. 7, fig. 10, 1866.—H. B. BRADY, Rep. Voy. *Challenger*, Zoology, vol. 9, p. 358, pl. 42, figs. 8–12, 1884.—FLINT, Rep. U. S. Nat. Mus. for 1897, p. 283, pl. 28, fig. 3, 1899.—MILLETT, Journ. Roy. Micr. Soc., 1899, p. 559, pl. 7, fig. 3.—BAGG, Proc. U. S. Nat. Mus., vol. 34, p. 131, 1908.—CUSHMAN, U. S. Nat. Mus. Bull. 71, pt. 2, p. 24, figs. 42–44 (in text), 1911.—YABE and HANZAWA, Jap. Journ. Geol. Pal., vol. 4, p. 50, 1925 (1926).

Bolivina quadrilatera WRIGHT, Proc. Roy. Irish Acad., ser. 3, vol. 1, p. 475, 1891.—CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 3, p. 44, pl. 8, fig. 2, 1922.

Bolivinita quadrilatera MAKIYAMA, Mem. College Sci. Kyoto Imp. Univ., ser. B, vol. 7, No. 1 (art. 1), p. 42 (list), 1931.—CUSHMAN, B. P. Bishop Mus. Bull. 119, p. 121, pl. 14, figs. 12*a*, *b*, 1934.—CHAPMAN and PARR, Australasian Antarctic Exped., ser. C, vol. 1, pt. 2, p. 101, 1937.—ASANO, Journ. Geol. Soc. Japan, vol. 45, No. 538, p. 607, pl. 16 (5), fig. 17, 1938.

Test elongate, slender, very slightly tapering, in end view quadrilateral, the angles usually carinate; chambers high and narrow, running back obliquely on the outer border, compressed; the initial end of the test often with a stout spine, occasionally with several small spines or smooth and broadly rounded, the early chambers sometimes with one or more longitudinal raised costae for a short distance; wall hyaline, distinctly perforate; aperture at one side near the distal end of the chamber, sometimes obliquely elongate, but somewhat variable. Length, up to 1.25 mm.

This species was originally described from the Pliocene of Kar Nicobar by Schwager. It is a characteristic species of the present Indo-Pacific region although it apparently also occurs in the Atlantic. The Atlantic specimens, however, as a rule seem to lack the basal spine, and it may be that other differences may make it possible to separate the Atlantic form. In the present collections this species has occurred almost entirely at *Albatross* stations, the data for which will be found in table 2. In addition it has occurred at 3 fathoms, Viva Anchorage, Fiji, and at 12 fathoms off Levuka, Fiji. At some of the *Albatross* stations, as will be noted, the species is relatively abundant.

TABLE 2.—*Bolivinita quadrilatera*—*material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom [1]	Occurrence
				Fathoms	°*F.*		
24701	1	H3795	Lat. 8°33′00″ S., long. 139°36′00″ W.	1,802	35.5	gy. yl. oz. crs. glob.	Rare.
24702	1	H3798	Cape Martin, Nukuhiva Island, N. 30° E., dist. 6½ miles.	687	39.5	drab vol. oz. glob..	Do.
24703	2						
24704	4	H3838	Lat. 16°57′00″ S., long. 148° 58′00″ W.	2,224	.....	vol. m. glob.....	Few.
24705	10+	H3840	Lat. 17°21′00″ S., long. 149° 15′00″ W.	1,585	.....	vol. m.....	Abundant.
24706	2	H3841	Point Venus, Tahiti Island, S. 32°, 4.2 miles W.	775	.....	crs. vol. s. mang. nod.	Do.
24707	10+						
24708	2	H3843	Point Venus, Tahiti Island, S. 55°, 3.8 miles E.	807	.....	fne. vol. s. m.....	Rare.
24709	9	H3945	Northeast point Murea Island, 5 miles SW.	981	36.7	crs. vol. s. pter....	Common.

[1] Key to abbreviations is given in table 1.

Genus BOLIVINELLA Cushman, 1927

Bolivinella CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 2, pt. 4, p. 79, 1927.

Genoholotype.—*Textularia folia* Parker and Jones.

Test much compressed, proloculum in megalospheric form rectangular, in microspheric form the young apparently planispiral; later chambers biserial, long and recurved, not overlapping; wall calcareous, perforate; aperture transverse to compression of test, with numerous papillae at base of opening. Eocene (?), Lower Oligocene to Recent.

BOLIVINELLA FOLIA (Parker and Jones)

PLATE 2, FIGURES 1–4, 6

Textularia folia PARKER and JONES, Philos. Trans. Roy. Soc., vol. 155, pp. 370, 420, pl. 18, fig. 19, 1865.—MOEBIUS, Beitr. Meeresfauna Insel Mauritius, p. 92, pl. 8, figs. 16, 17, 1880.—H. B. BRADY (in part), Rep. Voy. *Challenger*, Zoology, vol. 9, p. 357, pl. 42, figs. 3–5 (not 1, 2), 1884.—EGGER, Abh. kön. bay. Akad. Wiss. München, Cl. II, vol. 18, p. 272, pl. 6, figs. 27, 28, 1893.—CHAPMAN, Journ. Linn. Soc. London (Zoology), vol. 28, p. 184, 1900 (1902).—RHUMBLER, Zool. Jahrb., Abt. Syst., vol. 24, p. 59, pl. 5, figs. 51, 52, 1906.—CHAPMAN, Journ. Quekett Micr. Club, ser. 2, vol. 10, p. 127, pl. 9, fig. 4, 1907.—BAGG, Proc. U. S. Nat. Mus., vol. 34, p. 130, 1908.—CUSHMAN, U. S. Nat. Mus. Bull. 71, pt. 2, p. 19, figs. 31–33 (in text), 1911.—HERON-ALLEN and EARLAND, Trans. Zool. Soc. London, vol. 20, p. 623, 1915.—CUSHMAN, Carnegie Inst. Washington Publ. 342, p. 12, pl. 7, fig. 2, 1924.—HERON-ALLEN and EARLAND, Journ. Linn. Soc. Zool., vol. 35, p. 617, 1924.—CUSHMAN, B. P. Bishop Mus. Bull. 27, p. 123, 1925.

Bolivinella folia CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 2, pt. 4, p. 79, 1927; vol. 5, p. 29, pl. 5, figs. 1, 2, 1929; Cushman Lab. Foram. Res. Special

Publ. No. 1, pl. 33, figs. 15, 16; pl. 34, fig. 8, 1928.—Parr, Proc. Roy. Soc. Victoria, new ser., vol. 44, pt. 2, p. 223, pl. 21, fig. 23, 1932.—Cushman, Cushman Lab. Foram. Res. Special Publ. No. 4, pl. 21, fig. 11, 1933; No. 5, pl. 26, figs. 23*a*, *b*, 1933.—Asano, Journ. Geol. Soc. Japan, vol. 45, No. 538, p. 607, pl. 16 (5), fig. 20, 1938.

Test free, very much compressed, broad and triangular in front view, the apertural end usually broadly convex, in end view narrow, widest near the middle, thence tapering toward the rather acute lateral margins; chambers broad and low in the adult, in two alternating series, somewhat curved; sutures thickened, in the later portion usually somewhat sigmoid, median line with a slightly raised median suture; wall rather coarsely perforate; proloculum rounded or quadrangular, periphery often with spines at the outer angles or sometimes at the sides, independent of the individual chambers. Length, usually not more than 0.50 mm.

This is one of the typical Indo-Pacific species especially in the warm shallow waters of coral reefs. There are numerous records for the Indo-Pacific as follows: Shore sand, Melbourne (Parker and Jones); Mauritius, rare, from the intestine of *Maretia planulata* (Moebius); off East Moncoeur Island, Bass Strait, 38 fathoms; off Raine Island, Torres Strait, 155 fathoms; off Kandavu, Fiji, 255 fathoms; off Levuka, Fiji; Nares Harbor, Admiralty Islands, 17 fathoms; Honolulu coral reefs, 40 fathoms (H. B. Brady); Mauritius and East Australia (Egger); from the lagoon at Funafuti; shore sands of Victoria (Chapman); shallow water off Laysan Island (Rhumbler); off the Hawaiian Islands, 305 fathoms (Bagg), 249 and 271 fathoms (Cushman); a single specimen from the Kerimba Archipelago, 5–10 fathoms (Heron-Allen and Earland); Lord Howe Island (Heron-Allen and Earland); a single specimen, Philippines; and Hawaii to Midway Island (Cush-

Table 3.—*Bolivinella folia—material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°*F.*		
24710	1	H3809	Entrance to Avatoru Pass, Rahiroa Atoll, 2.5 miles S.	645	------	fne. wh. co. s-----	Rare.
24711	1	H3815	Lat. 15°15′00″ S., long. 147°51′35″ W.	524	------	wh. co. s. brk. sh--	Do.
24712	2	H3858	Ngaruae Pass, Fakarava Atoll, S. 28°, 1 mile E.	599	------	crs. co. s----------	Do.
24713	2	H3873	Southwest point of Tahanae, N. 68°, 4 miles E.	966	------	glob. oz. mang----	Do.
24714	1	H3896	Tekokoto Atoll, 1 mile E------	617	38.4	co. s----------	Do.
24715	1	H3910	Southwest point of Aki Aki, 1 mile E.	377	43.0	co. s----------	Do.
24716	1	H3915	Pinaki Atoll, 3.5 miles SE-----	860	37.0	glob. mang--------	Do.
24717	1	H3916	Pinaki Atoll, 1 mile E---------	486	41.0	crs. co. s. pter. oz--	Do.

man). In addition to the above localities the species has occurred at several *Albatross* stations, data for which are given in table 3. It has also been found to be common in shallow water at the following stations about the Fiji Islands: Off Nairai, 12 and 24 fathoms; off Levuka, 12 fathoms; and Mokaujar Anchorage. There are also abundant specimens from Makemo Lagoon, Paumotu Islands. It seems strange that the species should be absent from the shoal-water collections of some of the other regions that are represented by material, such as the Marshall Islands and Ladrone Islands.

BOLIVINELLA FOLIA (Parker and Jones) var. ORNATA Cushman

PLATE 2, FIGURES 5, 8

Bolivinella folia (PARKER and JONES) var. *ornata* CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 5, p. 32, pl. 5, figs. 3, 4, 1929.

Test somewhat similar to the typical form but the apertural end much more convex, typically with a large stout spine at either side, the sutures broadly limbate and raised throughout into a fine beaded ornamentation, the median line slightly raised but not markedly so.

This variety was originally described from the shore sand of Hardwicke Bay, Australia. There is a single specimen in our collections from 12 fathoms off Levuka, Fiji, and it has not occurred elsewhere.

BOLIVINELLA MARGARITACEA Cushman

PLATE 2, FIGURE 7

Bolivinella margaritacea CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 5, p. 33, pl. 5, fig. 5, 1929.

Test elongate, whole test very gradually broadening as chambers are added, sides usually irregularly indented and with irregular spinose projections of small size or wanting; chambers gently curved, the last one slightly sigmoid; sutures limbate, slightly raised, the earlier ones only slightly curved, later ones tending to become sigmoid and irregularly beaded, median line with a very slightly channeled ridge. Length, 0.40 mm.; breadth, 0.20 mm.

This species was described from the Miocene of France, the fauna of which is related in many ways to the present Indo-Pacific fauna. It is, therefore, not surprising that a typical specimen, which is here figured, appears in the material from Rutavu.

Subfamily EOUVIGERININAE

Genus NODOGENERINA Cushman, 1927

Nodogenerina CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 2, pt. 4, p.79, 1927.
Sagrina (part) of authors.

Genoholotype.—Nodogenerina bradyi Cushman.

Test elongate, uniserial, straight; chambers increasing in size as added, distinct, inflated; sutures depressed; wall calcareous, finely perforate; aperture terminal, central, rounded, with a cylindrical neck and phialine lip. Cretaceous to Recent.

NODOGENERINA (?) SPINATA Cushman

PLATE 2, FIGURE 11

Nodogenerina spinata CUSHMAN, B. P. Bishop Mus. Bull. 119, p. 123, pl. 14, fig. 14, 1934.

Test elongate, very rapidly tapering from the somewhat rounded base; most of the chambers of the same diameter or even slightly smaller toward the apertural end, inflated; sutures distinct, depressed; wall calcareous, finely perforate, ornamented with numerous spines projecting backward and more abundant on the lower half of the chamber; aperture rounded, at the end of an elongate neck which has a slight lip.

Holotype (Bishop Museum No. 1308) from the late Tertiary of Fiji.

We have from *Albatross* station H3866, lat. 17°17′00″ S., long. 145°45′30″ W., in 804 fathoms, glob. oz. mang., a single typical specimen of this species, which is here figured. Its distribution must, therefore, be very greatly restricted, occurring in the late Tertiary and still living off Fiji.

NODOGENERINA (?) MILLETTI Cushman

PLATE 2, FIGURES 9, 10

Sagrina nodosa MILLETT (not Parker and Jones), Journ. Roy. Micr. Soc., 1903, p. 271, pl. 5, figs. 12–15.

Nodogenerina milletti CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 9, p. 86, pl. 8, figs. 17, 18, 1933.

Test elongate, tapering rapidly from the somewhat narrow base, greatest breadth in the adult specimens near the middle, and later chambers somewhat reduced in size; chambers numerous, those of the early portion not inflated, later ones much inflated and excavated at the base forming a distinct ridge about that portion; sutures distinct, depressed especially in the later portion; wall calcareous, perforate, ornamented by very fine longitudinal costae which tend to break up into fine rows of papillae; aperture rounded, at the end of a slight neck but without a definite lip. Length, 0.70 mm.; breadth, 0.20 mm.

The holotype is from 21 fathoms, Guam Anchorage, Ladrone Islands. The only other records for this species are those given by Millett from the Malay region. This is not the same as Parker and Jones' species, and the generic position of it is very much in

doubt. Millett figures some very strange forms with lobed chambers and the early portions possibly not entirely uniserial. Our specimens have been too few to warrant the making of sections to determine the structure of this early part, and this generic position must remain doubtful until sufficient material can be obtained for sectioning.

Family BULIMINIDAE

Subfamily TURRILININAE

Genus BULIMINELLA Cushman, 1911

Buliminella CUSHMAN, U. S. Nat. Mus. Bull. 71, pt. 2, p. 88, 1911.

Genoholotype.—Bulimina elegantissima d'Orbigny.

Test an elongate close spiral, the spiral suture distinct; chambers three or usually more in a whorl; wall calcareous, perforate; aperture elongate, loop-shaped, very slightly twisted. Cretaceous to Recent.

BULIMINELLA MILLETTI Cushman

PLATE 3, FIGURES 1-4

Buliminella milletti CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 9, p. 78, pl. 8, figs. 5, 6, 1933.

Bulimina elegantissima var. SIDEBOTTOM, Mem. Proc. Manchester Lit. Philos. Soc., vol. 49, No. 5, p. 11, pl. 2, figs. 7–12; pl. 3, figs. 1, 2, 1905.

Test small, tapering, initial end bluntly rounded, increasing in diameter toward the apertural end, consisting of two or three whorls; chambers distinct, four or more making up the last whorl, slightly inflated; sutures distinct, flush with the surface or slightly depressed, especially the spiral suture, slightly limbate; wall smooth, very finely perforate; aperture a semielliptical opening at the base of the apertural face which is broadly rounded with slight ridges running into the depressed area at the center. Length, 0.30 mm.; diameter, 0.15–0.20 mm.

The types are from Mokaujar Anchorage, Fiji. The species occurs at various localities in the Fiji Islands, Pago Pago Harbor, Samoa, Zanzibar, Montego Bay, Jamaica, the Dry Tortugas, and St. Johns, Antigua. It has been reported by Sidebottom from the Island of Delos. The species also occurs in the shallow-water samples from 12 fathoms, Levuka, Fiji; 12 and 24 fathoms, Nairai, Fiji; 18 fathoms, Vavau Anchorage, Tonga Islands; off Niau and Niau Lagoon, Rongelap Atoll, Marshall Islands; 7 fathoms, Rotonga; Port Lotten, Kersail, Caroline Islands; and 21 fathoms, Guam Anchorage, Ladrone Islands. It did not occur at any of the deeper *Albatross* stations.

The species is larger, more tapering, and has fewer whorls than *Buliminella parallela* Cushman and Parker.

BULIMINELLA MADAGASCARIENSIS (d'Orbigny) var. SPICATA Cushman and Parker, new name

PLATE 3, FIGURES 5, 6

Bulimina elegantissima D'ORBIGNY var. *apiculata* CHAPMAN (not Egger), Journ. Linn. Soc. London (Zoology), vol. 30, p. 31, pl. 4, fig. 77, 1907.—SIDEBOTTOM, Journ. Roy. Micr. Soc., 1918, p. 23, pl. 3, fig. 11.

Buliminella elegantissima (D'ORBIGNY) var. *apiculata* CUSHMAN, Carnegie Inst. Washington Publ. 342, p. 25, 1924.

Buliminella apiculata CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 5, p. 44, pl. 7, figs. 6, 7, 1929.—CUSHMAN and PARKER, Contr. Cushman Lab. Foram. Res., vol. 13, p. 39, pl. 4, figs. 10*a*, *b*,1937.

Variety differing from the typical in its somewhat larger size and in the presence of a stout, basal spine. Length, 0.40–0.72 mm.; diameter, 0.24–0.38 mm.

The types are from the Oligocene, Grices Creek, Balcombe Bay, Kackeraboite Creek, and Altoona Bay Coal Shaft, Victoria, Australia. The variety also occurs in the Oligocene, Byram marl, Byram, Miss., and the Miocene and Recent of Australia, and in the Recent of the Fiji and Samoan Islands. In our material it has occurred at one *Albatross* station, H3931, Anu Anuraro Atoll, ½ mile southeast, in 405 fathoms at 42.5° F., co.s.pter.oz.mang.part., as a single specimen. A number of specimens were found in the material dredged at 40–50 fathoms off Fiji; a few at Mokaujar Anchorage, Fiji; and single specimens from Makemo Lagoon and Pinaki Atoll in the Paumotu Islands.

This variety has been given a new name owing to the priority of Egger's *Bulimina ovata* d'Orbigny var. *apiculata* (1895).

There is a great variation in size. The Recent specimens are especially large and bear a close resemblance to *Buliminella spinigera* Cushman. They differ, however, in lacking the high polish of the latter, in having more numerous, more distinct chambers, and a less regular shape.

Genus BULIMINOIDES Cushman, 1911

Buliminoides CUSHMAN, U. S. Nat. Mus. Bull. 71, pt. 2, p. 90, 1911.

Genoholotype.—Bulimina williamsoniana H. B. Brady.

Test subcylindrical, elongate, spirally twisted; chambers in a spiral, several chambers in a whorl, largely obscured by the heavy longitudinal costae; wall calcareous, perforate; aperture terminal, central, circular, in a depression at the end of the test. Recent.

BULIMINOIDES WILLIAMSONIANA (H. B. Brady)

PLATE 3, FIGURES 7–9

Bulimina williamsoniana H. B. BRADY, Quart. Journ. Micr. Sci., vol. 21, p. 56, 1881; Rep. Voy. *Challenger*, Zool., vol. 9, p. 408, pl. 51, figs. 16, 17, 1884.—MILLETT, Journ. Roy. Micr. Soc., 1900, p. 279, pl. 2, fig. 8.—BAGG, Proc. U. S. Nat. Mus., vol. 34, p. 136, 1908.—HERON-ALLEN and EARLAND, Trans. Zool. Soc. London, vol. 20, p. 641, 1915; British Antarctic (*Terra Nova*) Exped., Zool., vol. 6, p. 130, 1922.

Buliminoides williamsoniana Cushman, U. S. Nat. Mus. Bull. 71, pt. 2, p. 90, fig. 144 (in text), 1911; Carnegie Inst. Washington Publ. 311, p. 31, pl. 3, fig. 7, 1922; U. S. Nat. Mus. Bull. 104, pt. 3, p. 113, 1922; Carnegie Inst. Washington, Publ. 342, p. 25, pl. 7, figs. 3, 4, 1924; Cushman Lab. Foram. Res. Special Publ. No. 4, pl. 22, fig. 5, 1933; No. 5, pl. 27, figs. 6, 7, 1933.—Bermudez, Mem. Soc. Cubana Hist. Nat., vol. 9, p. 194, 1935.

Test elongate, subcylindrical, broadly rounded at the initial end and increasing slightly in breadth toward the apertural end, circular or nearly so in transverse section; chambers and sutures indistinct owing to ornamentation of the surface, which consists of longitudinal costae usually somewhat spirally twisted, running unbroken from the initial to the apertural end and to the rim of the aperture; aperture rounded, circular or elliptical, in the middle of the sunken apertural face. Length, up to 0.75 mm.; diameter, 0.15–0.20 mm.

This is a widely distributed species in the Indo-Pacific with the exception of the records from the Tortugas region in the Atlantic, where it occurs rarely but in typical form. The aperture is often broken owing probably to the fact that the young are developed in the final chamber and the wall breaks down when they are released. Specimens have occurred at the following shallow-water stations: 12 fathoms, Levuka, Fiji; Mokaujar Anchorage, Fiji; 12 fathoms, Nairai, Fiji; Port Lotten, Kersail, Caroline Islands; and Rangiroa. In the *Albatross* material it occurred only at station H3954, west end of Nomuka Island, N. 33°, 6 miles east, in 600 fathoms, at 39.2° F., co.s.pum.pter.oz.

Genus ROBERTINA d'Orbigny, 1846

Robertina d'Orbigny, Foram. Foss. Bass. Tert. Vienne, p. 202, 1846.

Genoholotype.—Robertina arctica d'Orbigny.

Test an elongate close spiral, the spiral suture distinct; chambers several in each whorl, in microspheric young like *Buliminella*, later forming a double series; wall calcareous, finely perforate; aperture elongate, loop-shaped. Eocene to Recent.

ROBERTINA SUBCYLINDRICA (H. B. Brady)

Plate 3, Figure 14

Bulimina subcylindrica H. B. Brady, Quart. Journ. Micr. Sci., vol. 21, p. 56, 1881; Rep. Voy. *Challenger*, Zoology, vol. 9, p. 404, pl. 50, figs. 16*a*, *b*, 1884.—Millett, Journ. Roy. Micr. Soc., 1900, p. 277, pl. 2, fig. 6.—Sidebottom, Journ. Roy. Micr. Soc., 1918, p. 122, pl. 3, fig. 7.

Robertina subcylindrica Cushman and Parker, Contr. Cushman Lab. Foram. Res., vol. 12, p. 95, pl. 16, figs. 10*a*, *b*, 1936.

Test subcylindrical, broadly rounded at both ends, about four pairs of chambers in the last-formed whorl, the chambers of the lower series much more elongate than those of the upper ones, somewhat inflated; sutures distinct, slightly depressed, somewhat limbate; wall

smooth, thin, translucent; aperture comparatively short, narrow, nearly in the line of the elongate axis, supplementary aperture very inconspicuous. Length, 0.50 mm.; diameter, 0.24 mm.

Brady's types of this species were from *Challenger* station 120, off Pernambuco, Brazil. It has been recorded from the Indo-Pacific and Australian regions. We have a typical specimen from 98 fathoms, off the Big King, New Zealand, and one specimen from off the Philippines. It is interesting, therefore, to find that in our Pacific material this species is comparatively rare, occurring almost entirely at the deeper *Albatross* stations and found only once at Rutavu in the shallow-water samples and then only as a single specimen.

TABLE 4.—*Robertina subcylindrica*—*material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°*F.*		
24718	1	H3858	Ngaruae Pass, Fakarava Atoll, S. 28°, 1 mile E.	599	------	crs. co. s----------	Few.
24719	3						
24720	1	H3879	Lat. 16°03′00″ S., long. 143° 32′30″ W.	1,084	36.3	gy. yl. glob. oz----	Rare.
24721	1	H3883	Northwest Pass, Raroia, 5 miles SE.	1,385	35.7	gy. yl. glob. oz. mang. part.	Do.
24722	2	H3896	Tekokoto Atoll, 1 mile E-----	617	38.4	co. s----------	Do.
24723	1	H3924	Nukutipipi Atoll, 1 mile NW.	649	39.0	co. s. brk. sh------	Do.

Subfamily BULIMININAE

Genus BULIMINA d'Orbigny, 1826

Bulimina D'ORBIGNY, Ann. Sci. Nat., vol. 7, p. 269, 1826.
Synonyms: *Pleurites* Ehrenberg, 1854; *Cucurbitina* Costa, 1856.

Genotype.—By designation, *Bulimina marginata* d'Orbigny.

Test an elongate spiral, generally triserial; chambers inflated, spiral suture more or less obsolete; wall calcareous, perforate; aperture loop-shaped, with a tooth or plate at one side and an internal spiral tube connecting through the chambers between the apertures. Jurassic to Recent.

BULIMINA ROSTRATA H. B. Brady

PLATE 3, FIGURE 12

Bulimina rostrata H. B. BRADY, Rep. Voy. *Challenger*, Zoology, vol. 9, p. 408, pl. 51, figs. 14, 15, 1884.—CUSHMAN, U. S. Nat. Mus. Bull. 71, pt. 2, p. 87, figs. 140*a*, *b*, 1911; Bull. Scripps Inst. Oceanogr., Tech. Ser., vol. 1, p. 152, pl. 2, fig. 12, 1927.—CUSHMAN and PARKER, Contr. Cushman Lab. Foram. Res., vol. 16, p. 13, pl. 2, figs. 29–31, 1940.

Bulimina buchiana CUSHMAN (not d'Orbigny), U. S. Nat. Mus. Bull. 104, pt. 3, p. 95, pl. 20, fig. 4, 1922.

Test small, fusiform, often somewhat curved, broadest near the middle, rounded at the apertural end, pointed at the initial end; chambers indistinct; sutures indistinct, occasionally showing slightly between the costae, slightly depressed; wall of last chamber smooth, rather coarsely perforate, remainder of test ornamented by ten or eleven regular, platelike costae, continuous throughout; aperture small, loop-shaped, at the apex of the test. Length (of figured specimen), 0.40 mm.; diameter, 0.20 mm.

The types are from the Recent, Ki Islands, in 428 fathoms. The species is found in both the north and south Pacific. In our material it occurred at *Albatross* station H3900, midway between Hikueru and Marokau, in 1,620 fathoms.

BULIMINA ELONGATA d'Orbigny var. SUBULATA Cushman and Parker

PLATE 3, FIGURE 13

Bulimina elongata D'ORBIGNY var. *subulata* CUSHMAN and PARKER, Contr. Cushman Lab. Foram. Res., vol. 13, p. 51, pl. 7, figs. 6, 7, 1937.

Bulimina aculeata REUSS (not d'Orbigny), Denkschr. Akad. Wiss. Wien, vol. 1, p. 374, pl. 47, fig. 13, 1850.—EGGER, Jahresb. Naturh. Ver. Passau, vol. 16, p. 17, pl. 3, figs. 8, 10, 13, 14, 1895.—MACFADYEN, Egypt Geol. Survey, 1930, p. 55, pl. 1, fig. 19, 1931.—HOFKER (part), Pubbl. Staz. Zool. Napoli, vol. 12, pt. 1, p. 121, figs. 33-35, 1932.

Bulimina spinosa SEGUENZA, Accad. Gioenia Sci. Nat. Atti, ser. 2, vol. 18, p. 23, pl. 1, figs. 8, 8*a*, 1862.—CUSHMAN and PARKER, Contr. Cushman Lab. Foram. Res., vol. 14, p. 62, 1938.

Bulimina ovata PARKER and JONES (not d'Orbigny), Philos. Trans. Roy. Soc., vol. 155, p. 374, pl. 17, figs. 67 *a*, *b*, 1865.

Bulimina elongata H. B. BRADY (not d'Orbigny), Rep. Voy. *Challenger*, Zoology, vol. 9, p. 401, pl. 51, figs. 1, 2, 1884.

Bulimina elegans EGGER (not d'Orbigny), Abh. kön. bay. Akad. Wiss., Cl. II, vol. 18, p. 284, pl. 8, figs. 66, 67, 1893; Jahresb. Naturh. Ver. Passau, vol. 16, p. 16, pl. 3, fig. 9, 1895.

Variety differing from the typical in having well-developed spines at the base of the test, varying in length and number.

This variety is represented in the *Albatross* material only from H3977, southeast point of Elmore Atoll, N. 30°, 9 miles west, in 1,283 fathoms, at 35.9° F., crs. glob. oz. Its absence from the shallow-water stations is not to be wondered at, as the records of living specimens of this variety are mostly in either cool or deep waters. It is very rare at this station.

BULIMINA FIJIENSIS Cushman

PLATE 3, FIGURES 10, 11

Bulimina fijiensis CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 9, p. 79, pl. 8, figs. 7*a–c*, 1933.—CUSHMAN and PARKER, Contr. Cushman Lab. Foram. Res., vol. 16, p. 17, pl. 3, figs. 15, 16, 1940.

Test small, stout, slightly longer than broad, rounded; chambers distinct, inflated, somewhat globular, comparatively few, increasing rapidly in size as added; sutures distinct, depressed; wall coarsely

perforate except about the aperture where it is apparently without perforations; aperture loop-shaped, placed well above the junction of the second and third chambers. Length, 0.25 mm.; diameter, 0.15 mm.

This small species seems to be very distinct but limited in its distribution, as it has occurred only at the type station, 12 fathoms, Nairai, Fiji, and at Levuka, Fiji, also in 12 fathoms.

Subfamily VIRGULININAE

Genus VIRGULINA d'Orbigny, 1826

Virgulina d'Orbigny, Ann. Sci. Nat., vol. 7, p. 267, 1826.
Synonyms: *Strophoconus* Ehrenberg, 1843; *Grammobotrys* Ehrenberg, 1845.

Genoholotype.—*Virgulina squammosa* d'Orbigny.

Test elongate, more or less compressed, fusiform; early chambers spiral about the elongate axis, especially in the microspheric form, triserial, later becoming irregularly biserial, whole test usually twisted; wall calcareous, finely perforate; aperture elongate, loop-shaped, with an apertural tooth or plate and internal spiral tube. Lower Cretaceous to Recent.

VIRGULINA SCHREIBERSIANA Czjzek

Plate 4, Figure 1

Virgulina schreibersiana Czjzek, Haidinger's Nat. Abh., vol. 2, p. 11, pl. 13, figs. 18–21, 1848.—Reuss, Sitz. Akad. Wiss. Wien, vol. 55, pt. 1, p. 96, pl. 4, figs. 4, 5, 1867.—Karrer, Sitz. Akad. Wiss. Wien, vol. 58, pt. 1, p. 177, 1868.—Terrigi, Atti Accad. Pont. Nuovi Lincei, vol. 33, p. 74, pl. 2, figs. 38, 39, 1880; vol. 35, p. 190, 1883.—Mariani, Atti Soc. Ital. Sci. Nat., vol. 31, p. 100, 1888.—Terrigi, Mem. Com. Geol. Ital., vol. 4, pt. 1, p. 74, 1891.—Fornasini, Rend. Accad. Sci. Bologna, vol. 2, p. 18, pl. 2, fig. 9, 1897–1898 (1898); Mem. Accad. Sci. Istit. Bologna, ser. 5, vol. 8, p. 21 (111), fig. 24, 1900; vol. 9, p. 11, pl. 0, figs. 28, 44, 1901.—Silvestri, Atti Accad. Pont. Nuovi Lincei, vol. 57, p. 22, text figs. 1*a–c* (not 2*a–d* = *V. squammosa* d'Orbigny), 1903.—Sidebottom, Mem. Proc. Manchester Lit. Philos. Soc., vol. 49, No. 5, p. 13, pl. 3, fig. 4, 1905; vol. 54, pt. 3, p. 12, 1910.—Toula, Jahrb. kais.-kön. Geol. Reichs., vol. 64, pp. 638, 645, 1914 (1915); Verh. Geol. Reichs. Jahrb., 1914, p. 205.—Martinotti, Boll. Ufficio Geol. Ital., vol. 50, p. 3 (list), 1926.—Macfadyen, Geol. Survey Egypt, p. 56, pl. 1, figs. 24*a*, *b*, 1930 (1931).—Hofker, Pubbl. Staz. Zool. Napoli, vol. 12, fasc. 1, p. 117, fig. 3, 1932.—Cushman, Contr. Cushman Lab. Foram. Res., vol. 8, p. 17, pl. 3, figs. 5*a–c*, 1932.—Earland, *Discovery* Reports, vol. 13, p. 43, 1936.—Cushman, Cushman Lab. Foram. Res. Special Publ. No. 9, p. 13, pl. 2, figs. 11–20, 1937.

Virgulina squamosa Egger (not d'Orbigny), Jahresb. Naturh. Ver. Passau, vol. 16, p. 18, pl. 1, figs. 21*a–c*, 1895.

Test elongate, slender, only slightly compressed, periphery broadly rounded, initial portion strongly twisted, later biserial chambers often somewhat irregular in side view, those of one side being higher than the opposite series; chambers distinct, slightly inflated, high, par-

ticularly in the adult biserial portion, which consists usually of only about four chambers; sutures distinct, slightly depressed; wall smooth, finely perforate; aperture elongate in the adult, often failing to reach the base of the apertural face, but continuing on to the terminal end of the test. Length, up to 1.00 mm.; breadth, 0.20–0.25 mm.; thickness, 0.18–0.20 mm.

Specimens that may be referred to this species, which is common in the Mediterranean region, occurred abundantly at only one of the shallow-water stations, Port Lotten, Kersail, Caroline Islands. Specimens occurred also at *Albatross* station H3838, lat. 16°57′00″ S., long. 148°58′00″ W., in 2,224 fathoms, vol. m. glob.

VIRGULINA COMPLANATA Egger

PLATE 4, FIGURES 2–5

Virgulina schreibersiana CZJZEK var. *complanata* EGGER, Abh. kön. bay. Akad. Wiss. München, Cl. II, vol. 18, p. 292, pl. 8, figs. 91, 92. 1893.—CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 8, p. 11, pl. 2, figs. 6*a*, *b*, 1932.—EARLAND, *Discovery* Reports, vol. 10, p. 131, pl. 5, figs. 54, 55, 1934.

Virgulina subsquammosa CUSHMAN (not Egger), Carnegie Inst. Washington Publ. 342, p. 26, 1924.

Virgulina complanata CUSHMAN, Cushman Lab. Foram. Res. Special Publ. No. 9, p. 26, pl. 4, figs. 13–17, 1937.

Test elongate, slender, tapering throughout, greatest breadth formed by the last pair of chambers, strongly compressed, earliest portion somewhat twisted, later distinctly biserial; chambers increasing in height and length as added, later ones somewhat inflated; sutures distinct, depressed, oblique, slightly curved; wall smooth, finely perforate; aperture elongate, comparatively broad, slightly curved, extending to the base of the inner margin of the last-formed chamber. Length, 1.50 mm.; breadth, 0.40 mm.; thickness, 0.25 mm.

Our only specimens of this species are from *Albatross* stations, data for which are given in table 5. The types described by Egger are from off West Australia in 90–359 meters.

TABLE 5.—*Virgulina complanata—material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°*F.*		
24726	2	H3838	Lat. 16°57′00″ S., long. 148° 58′00″ W.	2,224	------	vol. m. glob.	Rare.
24727	1	H3840	Lat. 17°21′00″ S., long. 149° 15′00″ W.	1,585	------	vol. m	Do.
24728	1	H3841	Point Venus, Tahiti Island, S. 32°, 4.2 miles W.	775	------	crs. vol. s. mang. nod.	Do.
24729	2	H3888	Lat. 16°14′00″ S., long. 142° 50′00″ W.	1,516	35.5	glob. oz. mang	Do.

VIRGULINA PAUCILOCULATA H. B. Brady

PLATE 5, FIGURES 1–3

Virgulina pauciloculata H. B. BRADY, Rep. Voy. *Challenger*, Zoology, vol. 9, p. 414, pl. 52, figs. 4, 5, 1884.—EGGER, Abh. kön. bay. Akad. Wiss. München, Cl. II, vol. 18, p. 292, pl. 8, figs. 86–88, 94, 1893.—PEARCEY, Trans. Roy. Soc. Edinburgh, vol. 49, p. 1015, 1914.—CUSHMAN, U. S. Nat. Mus. Bull. 100, vol. 4, p. 168, 1921; Bull. 104, pt. 3, p. 121, 1922.—HERON-ALLEN and EARLAND, British Antarctic Exped., Zoology, vol. 6, p. 132, 1922.—CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 8, p. 10, pl. 2, figs. 3*a–c*, 1932; Special Publ. No. 9, p. 25, pl. 4, figs. 1–6, 1937.

Test typically about 2½ times as long as broad, only slightly compressed, the early, spirally twisted chambers irregular, elongate, but in adults with two to four biserial chambers somewhat more compressed and inflated; sutures distinct, slightly depressed, strongly oblique; wall smooth, finely perforate; aperture narrowly elliptical, with the opening usually somewhat narrowed at the base of the chamber. Length, up to 1.00 mm.; breadth, 0.30 mm.; thickness, 0.18 mm.

The original specimens described by Brady were from the South Pacific region. In our material it has occurred very rarely in the *Albatross* collections, the only record being *Albatross* station H3840, lat. 17°21′00″ S., long. 149°15′00″ W., in 1,585 fathoms, vol. III. It has, however, occurred abundantly in the shallow water at some stations, particularly off Fiji, at Viva Anchorage, in 3 fathoms; off Nairai, 12 and 24 fathoms; off Levuka, 12 fathoms; and off Niau. Specimens are common also in 7 fathoms off Rotonga, and are rare at Vivau Anchorage, Tonga Islands, in 18 fathoms.

VIRGULINA FIJIENSIS Cushman

PLATE 4, FIGURE 6

Virgulina fijiensis CUSHMAN, Cushman Lab. Foram. Res. Special Publ. No. 6, p. 49, pl. 7, figs. 9*a–c*, 1936; No. 9, p. 31, pl. 5, fig. 5, 1937.

Test very elongate, slender, six or seven times as long as broad, slightly compressed, somewhat twisted throughout, the later portion becoming more definitely biserial, periphery broadly rounded, slightly depressed, oblique; wall smooth, finely perforate; aperture narrowly elongate, slightly curved, continuing to the base of the inner margin of the last-formed chamber. Length, 1.60 mm.; breadth, 0.25 mm.; thickness, 0.18–0.20 mm.

The types are from off Nairai, Fiji, in 12 fathoms.

This is a very elongate, slender species, which keeps the twisted spiral character throughout most of its development.

Genus BOLIVINA d'Orbigny, 1839

Bolivina d'Orbigny, Voy. Amér. Mérid., vol. 5, pt. 5, p. 61, 1839.
Synonyms: *Sagrina* d'Orbigny, 1839; *Grammostomum* Ehrenberg, 1840; *Proroporus* Ehrenberg, 1844; *Clidostomum* Ehrenberg, 1845; *Brizalina* Costa, 1856.

Genotype.—By designation, *Bolivina plicata* d'Orbigny.

Test elongate, usually compressed, tapering, initial end and often whole test twisted; chambers typically biserial; wall calcareous, finely or coarsely perforate; aperture elongate, usually oblique, somewhat loop-shaded, often with a platelike tooth connecting with an internal tube. Cretaceous to Recent.

BOLIVINA VADESCENS Cushman

Plate 5, Figure 4

Bolivina vadescens Cushman, Contr. Cushman Lab. Foram. Res., vol. 9, p. 81, pl. 8, figs. 11*a*, *b*, 1933; Cushman Lab. Foram. Res. Special Publ. No. 9, p. 126, pl. 16, fig. 11, 1937.

Test elongate, in the adult about 2½ times as long as broad, periphery distinctly rounded, the early stages rapidly increasing in width as chambers are added, after which the sides become nearly parallel; chambers very distinct but not strongly inflated, of rather uniform shape throughout but increasing very slightly in size as added; sutures very distinct, limbate, peculiarly sigmoid, the inner end especially in the adult having almost a distinct angle after which the sutures pass to the border in a nearly straight line which is strongly oblique to the horizontal; wall smooth, but very distinctly perforate; aperture at the base of the last-formed chamber, consisting of a broad loop-shaped opening. Length, 0.65 mm.; breadth, 0.30 mm.; thickness, 0.15 mm.

This species in its general size and shape is very similar to *Bolivina oceanica*, but the chambers are very different in their shape, and the sutures particularly with their sigmoid curvature and strongly limbate character are very distinct. The species is fairly common in the shoal water of various areas. It occurs about Fiji off Nairai in 12 and 24 fathoms; off Levuka, 12 fathoms; Viva Anchorage, 3 fathoms; Makemo Lagoon, Paumotu Islands; Rotonga, 7 fathoms; and at Guam Anchorage, Ladrone Islands, 21 fathoms. The only *Albatross* station from which I have had the species is H3890, lat. 16°25′00″ S., long. 143°33′00″ W., in 1,108 fathoms, 36.1° F., glob. oz. mang.

BOLIVINA HANTKENIANA H. B. Brady

Plate 5, Figures 5–8

Bolivina hantkeniana H. B. Brady, Quart. Journ. Micr. Sci., vol. 21, p. 58, 1881; Rep. Voy. *Challenger*, Zoology, vol. 9, p. 424, pl. 53, figs. 16–18, 1884.—Egger, Abh. kön. bay. Akad. Wiss. München, Cl. II, vol. 18, p. 296, pl. 8, figs. 40–42, 1893.—Millett, Journ. Roy. Micr. Soc., 1900, p. 546, pl. 4, fig. 9.—Cushman, U. S. Nat. Mus. Bull. 71, pt. 2, p. 42, fig. 68 (in text), 1911.—Side-

BOTTOM, Journ. Roy. Micr. Soc., 1918, p. 127.—CUSHMAN, U. S. Nat. Mus. Bull. 100, vol 4, p. 132, pl. 27, fig. 2, 1921; Carnegie Inst. Washington, Publ. 342, p. 1[illegible] pl. 6, figs. 1, 2, 1924; Cushman Lab. Foram. Res. Special Publ. No. 9, p. 1[illegible] 7, pl. 16, figs. 18–20, 1937.

Test broad, much compressed, usually completely surrounded except at the aperture by a broad winglike flange, either entire or variously lobed; chambers inflated somewhat; sutures very distinct, slightly depressed; wall calcareous, with a few short, longitudinal costae, usually confined to the limits of the chamber on which they originate; aperture narrow, oval, with a single toothlike projection in the orifice. Length, up to nearly 1.00 mm.

This is a species originally described from the Indo-Pacific and confined to that area so far as authentic material has been examined. There are records for it from various Tertiary deposits, but the figures accompanying the records do not seem to belong to this very definite species. In our Recent collections the species has occurred almost entirely at *Albatross* stations, as will be noted in table 6. There are two distinct forms, one very broad and with distinct transparent keels about the periphery especially of the later chamber, the other form somewhat narrower and with the keels either wanting or greatly reduced. In both forms the characteristic costae are present but variable in number and strength. The only shallow-water station from which we had material is Viva Anchorage, Fiji, in 3 fathoms.

TABLE 6.—*Bolivina hantkeniana—material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°*F.*		
24806	9	H3838	Lat. 16°57′00″ S., long. 148° 58′00″ W.	2,224	------	vol. m. glob.	Common.
24807	10+	H3840	Lat. 17°21′00″S., long. 149° 15′00″ W.	1,585	------	vol. m.	Abundant.
24808	10	H3841	Point Venus, Tahiti Island, S. 32°, 4.2 miles W.	775	------	crs. vol. s. mang. nod.	Do.
24809	5						
24810	2	H3843	Point Venus, Tahiti Island, S. 55° 3.8 miles E.	807	------	fne. vol. s. m.	Rare.

BOLIVINA SPINEA Cushman

PLATE 6, FIGURE 1

Bolivina spinea CUSHMAN, Cushman Lab. Foram. Res. Special Publ. No. 6, p. 58, pl. 8, figs. 11*a*, *b*, 1936; No. 9, p. 131, pl. 16, fig. 26, 1937.

Test less than twice as long as broad, rapidly tapering, greatest breadth made by the last pair of chambers, initial end acute, with a large, stout spine, periphery in end view broadly rounded, almost truncate; chambers distinct, somewhat inflated, about twice as broad

as high, the middle area of each expanded into coarse, spinose projections; sutures distinct, strongly depressed, straight, oblique, forming an angle of 25°–30° with the horizontal in the adult, more strongly oblique in the early stages; wall distinctly perforate; aperture elongate, with a slightly expanded opening at the base of the inner margin of the chamber. Length, 0.60 mm.; breadth, 0.35 mm.; thickness 0.20 mm.

The types are from 40-50 fathoms off Fiji.

This resembles *B. simpsoni* Heron-Allen and Earland but is much more coarsely spinose.

BOLIVINA ROBUSTA H. B. Brady

PLATE 6, FIGURE 2

Bolivina robusta H. B. BRADY, Quart. Journ. Micr. Sci., vol. 21, p. 27, 1881; Rep. Voy. *Challenger*, Zoology, vol. 9, p. 421, pl. 53, figs. 7–9, 1884.—EGGER, Abh. kön. bay. Akad. Wiss. München, Cl. II, vol. 18, p. 294, pl. 8, figs. 31, 32, 1893.—CHAPMAN, Proc. Zool. Soc. London, 1895, p. 24.—MILLETT, Journ. Roy. Micr. Soc., 1900, p. 543.—CHAPMAN, Journ. Linn. Soc. Zool., vol. 28, p. 400 (list), 1902; Trans. New Zealand Inst., vol. 38, p. 89, 1905 (1906).—BAGG, Proc. U. S. Nat. Mus., vol. 34, p. 139, 1908.—CHAPMAN, Rep. Foram. Subantarctic Islands of New Zealand, p. 331, 1909; Journ. Linn. Soc. Zool., vol. 30, p. 404, 1910.—CUSHMAN, U. S. Nat. Mus. Bull. 71, pt. 2, p. 36, figs. 59, 60, 1911.—CHAPMAN, Biol. Res. *Endeavour*, vol. 3, pt. 1, p. 20, 1915.—HERON-ALLEN and EARLAND, Trans. Zool. Soc. London, vol. 20, p. 646, 1915.—SIDEBOTTOM, Journ. Roy. Micr. Soc., 1918, p. 126.—CUSHMAN, U. S. Nat. Mus. Bull. 100, vol. 4, p. 129, 1921.—HERON-ALLEN and EARLAND, British Antarctic Exped., Zool., vol. 6, p. 136, 1922; Journ. Linn. Soc. Zool., vol. 35, p. 621, 1924.—YABE and HANZAWA, Jap. Journ. Geol. Pal., vol. 4, p. 50, 1925 (1926).—HADA, Trans. Sapporo Nat. Hist. Soc., vol. 11, pt. 1, p. 11, 1929; Sci. Rep. Tohoku Imp. Univ., ser. 4, Biol., vol. 6, p. 131, fig. 88, 1931.—HERON-ALLEN and EARLAND, *Discovery* Reports, vol. 4, p. 345, 1932.—EARLAND, *Discovery* Reports, vol. 7, p. 102, 1933.—CUSHMAN, Cushman Lab. Foram. Res. Special Publ. No. 9, p. 131, pl. 17, figs. 1–4, 1937.

Bolivina acaulis EGGER, Abh. kön. bay. Akad. Wiss. München, Cl. II, vol. 18, p. 295, pl. 8, figs. 28–30, 1893.

Test about twice as long as broad, compressed, greatest breadth formed by the last pair of chambers, periphery subacute, initial end often with a single large acicular spine; chambers distinct, very slightly if at all inflated, much broader than high throughout, increasing gradually in size as added; sutures distinct, strongly limbate, obliquely curved, at the periphery forming an angle of about 45° with the horizontal, the later ones usually crenulate, owing to the basal margin of the chamber having a series of alternating lobes and reëntrants; wall coarsely perforate, somewhat sculptured by the crenulated margins, and occasionally showing traces of rudimentary costae; aperture a small, oval opening, often with a slight lip. Length, up to 0.60 mm.; breadth, 0.25–0.30 mm.; thickness, 0.15–0.18 mm.

This is a widely distributed species in comparatively deep water recorded at many stations in the Pacific but also apparently widely distributed in other parts of the world both Recent and fossil. It has not occurred abundantly at any of the stations, all of which are from the deeper-water *Albatross* collections. None of the highly developed forms with the long spine was present.

TABLE 7.—*Bolivina robusta*—*material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°F.		
24825	1	H3809	Entrance to Avatoru Pass, Rahiroa Atoll, 2.5 miles S.	645	------	fne. wh. co. s------	Rare.
24826	1	H3843	Point Venus, Tahiti Island, S.55°, 3.8 miles E.	807	------	fne. vol. s. m------	Do.
24827	1	H3850	Niau Atoll, S. 3°, 14 miles E.	677	------	co. s. glob. oz------	Do.
24828	1	H3853	Pakaka entrance to Apataki Lagoon, N.50°, 2 miles E.	613	39.4	co. vol.----------	Do.
24829	4	H3858	Ngaruae Pass, Fakarava Atoll S.28°, 1 mile E.	599	------	crs. co. s. --------	Few.
24830	1	H3873	Southwest point of Tahanae, N.68°, 4 miles E.	966	------	glob. oz. mang.----	Rare.
26327	1	H3883	Northwest Pass, Raroia, ½ mile SE.	508	40.2	crs. co. s. pter. oz..	Do.
24831	1	H3889	Southwest face of Taenga Atoll, N.67°, 3 miles E.	928	36.5	glob. pter. oz------	Do.
24832	1	H3898	Northwest point of Hikueru Atoll, 1/3 mile E.	348	43.8	co. s. brk. sh------	Do.
24833	1	H3900	Midway between Hikueru and Marokau.	1,372	35.7	glob. oz----------	Do.
24834	2	D3689	Northwest point of Marokau, N.40°, 4 miles E.	807	37.6	co. s. mang.-------	Do.
24835	1	H3954	West end of Nomuka Island, N.33°, 6 miles E.	600	39.2	co. s. pum. pter. oz----------	Do.
24836	2	H3974	South point of Jaluit Atoll, N.14°, 5 miles E.	1,937	35.0	crs. gy. glob. oz----	Do.

BOLIVINA SUBANGULARIS H. B. Brady

PLATE 6, FIGURES 3, 4

Bolivina subangularis H. B. BRADY, Quart. Journ. Micr. Sci., vol. 21, p. 29, 1881; Rep. Voy. *Challenger*, Zoology, vol. 9, p. 427, pl. 53, figs. 32, 33, 1884.—MILLETT, Journ. Roy. Micr. Soc., 1900, p. 545.—CUSHMAN, U. S. Nat. Mus. Bull. 71, pt. 2, p. 45, figs. 72, 73, 1911; U. S. Nat. Mus. Bull. 100, vol. 4, p. 135, 1921.—HANZAWA, Jap. Journ. Geol. Pal., vol. 4, p. 39 (table), 1925 (1926).—CUSHMAN, Cushman Lab. Foram. Res. Special Publ. No. 9, p. 133, pl. 17, figs. 5-10, 1937.

Test short and broad, once and a half to twice as long as broad, rhomboid in front view, greatest breadth formed by the last pair of chambers, periphery broadly rounded or somewhat truncate, central portion excavated; chambers distinct, comparatively few, little if at all inflated, broader than high, increasing rather uniformly in size as added; sutures distinct, slightly limbate in the early portion, strongly

oblique, forming an angle of about 45° with the horizontal; wall distinctly perforate, ornamented by longitudinal costae, sharp and high, few in number, usually one prominent one toward the periphery at each side, with supplementary ones at the periphery; aperture broadly oval, sometimes with a slight lip. Length, 0. 50–0. 75 mm.; breadth, 0. 25–0. 35 mm.; thickness, 0. 20-0. 30 mm.

This species was originally described by Brady from off the Philippines, and there are very few records for the species, all of which are found in the same general region. It has occurred rather abundantly at only one station in our material, that from 3 fathoms, Viva Anchorage, Fiji.

BOLIVINA SUBANGULARIS H. B. Brady var. LINEATA (Cushman)

PLATE 6, FIGURES 5, 6

Bolivinita subangularis H. B. BRADY var. *lineata* CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 9, p. 77, pl. 8, figs. 1, 2, 1933.

Variety differing from the typical in the wall, which is ornamented with supplementary small costae in addition to the typical large ones.

The types of this variety are from Levuka, Fiji, in 12 fathoms. It also occurs in 3 fathoms, off Viva Anchorage, Fiji.

BOLIVINA RHOMBOIDALIS (Millett)

PLATE 6, FIGURES 7, 8

Textularia rhomboidalis MILLETT, Journ. Roy. Micr. Soc., 1899, p. 559, pl. 7, fig. 4.—SIDEBOTTOM, Mem. Proc. Manchester Lit. Philos. Soc., vol. 49, No. 5, p. 8, pl. 2, fig. 2, 1905.

Bolivina rhomboidalis CUSHMAN, Carnegie Inst. Washington Publ. 311, p. 28, 1922; U. S. Nat. Mus. Bull. 104, pt. 2, p. 44, 1922.—COLE, Florida State Geol. Survey Bull. 6, p. 42, 1931.—HERON-ALLEN and EARLAND, *Discovery* Reports, vol. 4, p. 356, 1932.—BERMUDEZ, Mem. Soc. Cubana Hist. Nat., vol. 9, p. 194, 1935.—CUSHMAN, Cushman Lab. Foram. Res. Special Publ. No. 9, p. 138, pl. 18, fig. 7, 1937.

Test generally triangular in front view, slightly longer than broad, increasing in breadth from the rather bluntly pointed initial end to the broad, somewhat obliquely truncate, apertural end, periphery obliquely truncate; chambers numerous, distinct, very slightly inflated, increasing rather uniformly in size as added; sutures distinct, somewhat oblique; wall rather coarsely perforate, otherwise smooth; aperture oval, somewhat elongate. Length, 0.40 mm.

This species was originally described from the Malay Archipelago by Millett. It has since been recorded from widely separated regions. Our specimens are from Rotonga and from Rangiroa.

BOLIVINA TORTUOSA H. B. Brady

PLATE 7, FIGURE 1

Bolivina tortuosa H. B. BRADY, Quart. Journ. Micr. Soc., vol. 21, p. 57, 1881; Rep. Voy. *Challenger*, Zoology, vol. 9, p. 420, pl. 52, figs. 31, 32 (not 33, 34), 1884.—EGGER, Abh. kön. bay. Akad. Wiss. München, Cl. II, vol. 18, p. 298, pl. 8, figs. 43, 44 (part), 1893.—MILLETT, Journ. Roy. Micr. Soc., 1900, p. 543.—CHAPMAN, Journ. Linn. Soc. Zool., vol. 28, p. 187, 1900; p. 382, 1902.—SIDEBOTTOM, Journ. Roy. Micr. Soc., 1918, p. 127.—CUSHMAN, Carnegie Inst. Washington Publ. 342, p. 18, pl. 5, figs. 4, 5, 1924.—HERON-ALLEN and EARLAND, Journ. Roy. Micr. Soc., 1924, p. 145; Journ. Linn. Soc. Zool., vol. 35, p. 621, 1924.—YABE and HANZAWA, Jap. Journ. Geol. Pal., vol. 4, p. 50, 1925 (1926).—HANZAWA, Jap. Journ. Geol. Pal., vol. 4, p. 40 (table), 1925 (1926).—MACFADYEN, Geol. Survey Egypt, p. 57, 1930 (1931).—CUSHMAN and PARKER, Proc. U. S. Nat. Mus., vol. 80, art. 3, p. 16, pl. 3, figs. 22*a*, *b*, 1931.—BERMUDEZ, Mem. Soc. Cubana Hist. Nat., vol. 9, p. 195, 1935.

Test short and broad, slightly longer than broad, much compressed, periphery acute but not carinate, early portion with the axis much twisted; chambers few, distinct, comparatively high, periphery not lobulate; sutures distinct, not depressed; wall with numerous coarse punctae; aperture tending to become terminal, elongate, elliptical. Length, up to 0.35 mm.; breadth, up to 0.35 mm.

This species is one of the characteristic ones of the Indo-Pacific region, although there are records for it in the Atlantic. Some of the colder-water records for this species are evidently not the same, as the name has been applied to various species of *Bolivina* that have the same twisted test. *B. tortuosa* as developed in the Indo-Pacific region and found rarely in the Tropics elsewhere is a very distinctive and easily distinguished form. In our Pacific collections it has occurred at numerous *Albatross* stations, as will be seen from table 8, and often in considerable numbers. It is, however, most abundant in the shallow-water collections, occurring about the Fiji Islands in 40–50 fathoms; off Nairai, 12 fathoms; off Levuka, 12 fathoms; Viva Anchorage, 3 fathoms; and Mokaujar Anchorage. In other collections it has occurred at Vavau Anchorage, Tonga Islands, 18 fathoms; Rangiroa; Makemo Lagoon, Paumotu Islands; inside the lagoon at Pinaki Atoll, Paumotu Islands; Rongelap Atoll, Marshall Islands; and Port Lotten, Kersail, Caroline Islands.

BOLIVINA COMPACTA Sidebottom

PLATE 7, FIGURES 2, 3

Bolivina robusta H. B. BRADY var. *compacta* SIDEBOTTOM, Mem. Proc. Manchester Lit. Philos. Soc., vol. 49, No. 5, p. 15, pl. 3, fig. 7, 1905.

Bolivina compacta CUSHMAN, U. S. Nat. Mus. Bull. 71, pt. 2, p. 36, fig. 58, 1911; Bull. 100, vol. 4, p. 137, pl. 26, fig. 7, 1921; Carnegie Inst. Washington Publ. 311, p. 26, pl. 1, fig. 10, 1922; U. S. Nat. Mus. Bull. 104, pt. 3, p. 45, 1922; Carnegie Inst. Washington Publ. 342, p. 18, pl. 5, fig. 1, 1924.—HERON-

TABLE 8.—*Bolivina tortuosa—material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	*°F.*		
24863	1	H3841	Point Venus, Tahiti Island, S. 32°, 4.2 miles W.	775	------	crs. vol. s. mang. nod.	Rare.
24864	1	H3856	Northeast point of Apataki, 7 miles SW.	1,364	------	crs. co. s	Do.
24865	1	H3858	Ngaruae Pass, Fakarava Atoll, S. 28°, 1 mile E.	599	------	do	Do.
24866	1	H3873	Southwest point of Tahanae, N. 68°, 4 miles E.	966	------	glob. oz. mang	Do.
24867	2	H3883	Northwest Pass, Raroia, 5 miles SE.	1,385	35.7	gy. yl. glob. oz. mang. part.	Do.
24868	1	H3884	Northwest point of Raroia, ½ mile SE.	508	40.2	crs. co. s. pter. oz	Do.
24869	1	H3889	Southwest face of Taenga Atoll, N. 67°, 3 miles E.	928	36.5	glob. pter. oz	Do.
24870	2	H3890	Lat. 16°25′00″ S., long. 143° 33′00″ W.	1,108	36.1	glob. oz. mang	Do.
24871	1	H3894	Midway between Marutea and Nihiru islands.	1,125	36.0	glob. oz	Do.
24872	2	H3896	Tekokoto Atoll, 1 mile E	617	38.4	co. s	Do.
24873	1	H3899	Northwest point of Hikueru Atoll, 1.3 miles E.	798	37.8	co. s. pter. oz	Do.
24874	3	H3901	Northwest point of Marokau, 8 miles E.	1,620	35.6	glob. oz. mang	Do.
24875	1	H2909	Aki Aki Atoll, 5 miles E	1,364	35.6	glob. mang	Do.
24876	1	H3913	Northeast end of Nukutavake, 6 miles E.	1,688	35.2	mang. glob	Do.
24877	1	H3930	Anu Anuraro Atoll, ¾ mile NW.	438	40.7	co.s	Do.
24878	1	H3935	Hereheretue Atoll, 1 mile W	594	39.5	crs. co. s	Do.
24879	1	H3937	Hereheretue Atoll, 5.3 miles SE.	1,688	35.3	lt. br. glob. oz. mang. part.	Do.
24880	5	H3945	Northeast point of Murea Island, 5 miles SW.	981	36.7	crs. vol. s. pter	Few.
24881	1	H3965	Apaiang Atoll, in line with north point of Tarawa, 2 miles N.	170	51.3	gy. glob. c	Rare.
24882	2	H3974	South point of Jaluit Atoll, N. 14°, 5 miles E.	1,937	35.0	crs. gy. glob. oz	Do.
24883	2	H3977	Southeast point of Elmore Atoll, N. 30°, 9 miles W.	1,283	35.9	crs. glob. oz	Do.
24884	2	H3978	Wotju Island, Elmore Atoll, 6 miles SE.	1,068	36.5	co. s	Do.
24885	6	H3983	Entrance to South Pass, Rongelab, ½ mile N.	400	43.4	do	Few.
24886	10+	H3984	Entrance to South Pass, Rongelab, 1½ miles N.	746	39.0	crs. co. s	Abundant.
24887	5	H3989	South Pass, Likieb, ½ mile N	468	42.6	do	Few.
24888	4	H3992	Schischmarev Pass, Wotje, 1 mile N.	482	41.7	co. s	Do.
24889	6	H3993	Schischmarev Pass, Wotje, 3 miles N.	1,187	36.1	co. s. mang	Do.
24890	5	H3996	North point of Arhno Atoll, S. 50°, 7 miles E.	1,325	36.0	crs. glob. oz	Do.
24891	1	H3997	Southwest point Arhno Atoll, 6 miles NE.	1,253	36.0	glob. oz	Rare.

ALLEN and EARLAND, *Discovery* Reports, vol. 4, p. 354, 1932.—CUSHMAN, Cushman Lab. Foram. Res. Special Publ. No. 9, p. 135, pl. 17, figs. 22–24, 1937.

Test elongate, tapering, 2½ to 3 times as long as broad, periphery rounded, initial end bluntly pointed, apertural end obliquely rounded; chambers numerous, somewhat inflated; sutures very slightly depressed, not very distinct; wall ornamented by a series of large coarse punctae somewhat irregularly arranged, those of the last-formed chambers finer and more numerous; aperture elongate, extending from the base of the inner margin of the last-formed chamber to the highest point of the chamber. Length, up to 0.75 mm.; breadth, 0.25–0.30 mm.; thickness, 0.12–0.15 mm.

This is a widely distributed species in the Pacific material and is a striking one in its characters. The early portion of the test has a pearly luster and is very distinctive, the ornamentation consisting of coarse depressions with the portions of the wall between often raised into low platelike areas. Most of the records are from the deeper *Albatross* stations where it is often common, but it has also occurred somewhat less abundantly at the following shallow-water stations: Off Fiji, 40–50 fathoms; off Levuka, Fiji, 12 fathoms; off Nairai, Fiji, 12 and 24 fathoms; Viva Anchorage, 3 fathoms; and Mokaujar Anchorage, Fiji. It was abundant off Niau, and less abundant from Pinaki Atoll inside the lagoon. There are specimens also from Rangiroa; Vavau Anchorage, Tonga Islands, 18 fathoms; Guam Anchorage, Ladrone Islands, 21 fathoms; Rongelap Atoll, Marshall Islands; and from Makemo Lagoon, Paumotu Islands.

TABLE 9.—*Bolivina compacta—material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°*F.*		
24733	2	H3804	Entrance to Ahii Lagoon, 2.5 miles southeast.	1,208	------	lt. gy. oz. glob-----	Rare.
24734	2	H3809	Entrance to Avatoru Pass, Rahiroa Atoll, 2.5 miles south.	645	------	fne. wh. co. s------	Do.
24735	1	H3810	Entrance to Avatoru Pass, Rahiroa Atoll, 3.5 miles south.	661	------	wh. co. s. glob. oz. min. frag.	Do.
24736	1	H3812	Entrance to Avatoru Pass, Rahiroa Atoll, 7.5 miles south.	819	------	wh. co. s. glob. oz. vol. part.	Do.
24737	2	H3815	Lat. 15°15′00″ S., long. 147° 51′35″ W.	524	------	wh. co. s. brk. sh..	Do.
24738	2	H3816	Lat. 15°16′50″ S., long. 147° 52′30″ W.	450	------	pter. oz. vol. part..	Do.
24739	4	H3824	Lat. 15°00′20″ S., long. 148° 30′00″ W.	850	------	wh. pter. glob. oz..	Few.
24740	2	H3829	Lat. 14°56′00″ S., long. 148° 48′00″ W.	860	------	wh. co. s. glob. vol. part.	Do.
24741	3						

TABLE 9.—*Bolivina compacta—material examined*—Continued

U.S.N.M No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	*F.*		
24742	2	H3830	Lat. 15°00′30″ S., long. 148° 47′00″ W.	1,257	------	wh. co. s. glob. vol. part.	Rare.
24743	2	H3831	Lat. 15°16′00″ S., long. 148° 46′00″ W.	1,762	------	lt. gy. oz. glob-----	Do.
24744	2	H3838	Lat. 16°57′00″ S., long. 148° 58′00″ W.	2,224	------	vol. m. glob-------	Do.
24745	5	H3840	Lat. 17°21′00″ S., long. 149° 15′00″ W.	1,585	------	vol. m----------	Few.
24746	5	H3841	Point Venus, Tahiti Island, S. 32°, 4.2 miles west.	775	------	crs. vol. s. mang. nods.	Do.
24747	1	H3843	Point Venus, Tahiti Island, S. 55°, 3.8 miles east.	807	------	fne. vol. s. m------	Rare.
24748	1	H3850	Niau Atoll, S. 3°, 14 miles east.	677	------	co. s. glob. oz------	Do.
24749	1	H3851	Apataki, south end, 9 miles north.	675	------	pter. oz----------	Do.
24750	1	H3853	Pakaka entrance to Apataki Lagoon, N. 50°, 2 miles east.	613	39.4	co. vol----------	Few.
24751	3						
24752	3	H3856	Northeast point of Apataki, 7 miles southwest.	1,364	------	crs. co. s----------	Rare.
24753	3	H3858	Ngaruae Pass, Fakarava Atoll, S. 28°, 1 mile E.	599	------	-----do----------	Common.
24754	4						
24755	4	H3859	Ngaruae Pass, Fakarava Atoll, S. 35°, 3.5 miles E.	666	------	pter. oz. vol. part--	Few.
24756	3	H3870	Village, point of Anaa Atoll, S. 50°, 5 miles W.	1,110	36.0	fne. co. s. pter. oz. glob.	Rare.
24757	9	H3873	Southwest point of Tahanae, N. 68°, 4 miles E.	966	------	glob. oz. mang-----	Common.
24758	1						
24759	1	H3874	Southwest point of Tahanae, 2 miles E.	654	------	co. s. mang-------	Rare.
24760	1	H3879	Lat. 16°03′00″ S., long. 143°32′-30″ W.	1,084	36.3	gy. yl. glob. oz----	Do.
24761	1	H3881	Lat. 15°54′00″ S., long. 143°06′-00″ W.	1,568	35.4	glob. oz. mang----	Do.
24762	1						
24763	1	H3882	Lat. 15°55′00″ S., long. 142°39′-00″ W.	1,503	------	lt. br. glob. oz-----	Do.
24764	1						
24765	10+	H3883	Northwest Pass, Rarola, 5 miles SE.	1,385	35.7	gy. yl. glob. oz. mang. parts.	Abundant.
24766	2	H3887	Southwest point of Raroia Atoll, 1 mile NE.	630	38.3	co. s. mang-------	Rare.
24767	2	H3889	Southwest face of Taenga Atoll, N. 67°, 3 miles E.	928	36.5	glob. pter. oz------	Do.
24768	1						
24769	3	H3890	Lat. 16°25′00″ S., long. 143°33′-00″ W.	1,108	36.1	glob. oz. mang----	Do.
24770	2	H3891	Lat. 16°30′00″ S., long. 143°41′-00″ W.	540	39.7	co. s. pter. oz------	Do.
24771	3	H3892	Northeast pass, Makemo, 1 mile S.	603	39.0	crs. co. s----------	Do.
24772	10+	H3896	Tekokoto Atoll, 1 mile E------	617	38.4	co. s----------	Abundant.
24773	3						
24774	1	H3898	Northwest point of Hikueru Atoll, ½ mile E.	348	43.8	co. s. brk. sh------	Few.
24775	4						
24776	1	H3899	Northwest point of Hikueru Atoll, 1.3 miles E.	798	37.8	co. s. pter. oz------	Rare.
24777	4	H3900	Midway between Hikueru and Marokau.	1,372	35.7	glob. oz----------	Few.
24778	10+	H3901	Northwest point of Marokau, 8 miles E.	1,620	35.6	glob. oz. mang----	Abundant.

TABLE 9.—*Bolivina compacta—material examined*—Continued

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°*F.*		
24779	1	D3688	NW. point of Marokau, 2 miles E.	742	34.5	pter. oz. mang.	Rare.
24780	2	D3689	NW. point of Marokau, N. 40°, 4 miles E.	807	37.6	co. s. mang.	Few.
24781	3						
24782	1	H3905	Northwest point of Hao Atoll, ½ mile SE.	425	42.0	crs. co. s.	Rare.
24783	3	H3909	Aki Aki Atoll, 5 miles E.	1,364	35.6	glob. mang.	Do.
24784	2	H3913	Northeast end of Nukutavake, 6 miles E.	1,688	35.2	mang. glob.	Do.
24785	2	H3934	Hereheretue Atoll, 1 mile W.	1,719	35.0	glob. oz.	Do.
24786	1	H3936	Hereheretue Atoll, 0.3 mile E.	189	62.1	co. s. mang. part.	Do.
24787	8	H3937	Hereheretue Atoll, 5.3 miles SE.	1,688	35.3	lt. br. glob. oz. mang. part.	Common.
24788	3	H3945	Northeast point of Murea Island, 5 miles SW.	981	36.7	crs. vol. s. pter.	Rare.
27550	1	H3954	West end of Nomuka Island, N. 33°, 6 miles E.	600	39.2	co. s. pum. pter. oz.	Do.
24789	3	H3961	Center south coast of Tarawa, 10 miles N.	413	43.5	crs. br. glob. oz.	Do.
24790	2	H3974	South point of Jaluit Atoll, N. 14°, 5 miles E.	1,937	35.0	crs. gy. glob. oz.	Do.
24791	1						
24792	1	H3984	Entrance to South Pass, Rongelap, 1½ miles N.	746	39.0	crs. co. s.	Do.
24793	2	H3989	South Pass, Likieb, ½ mile N.	468	42.6	do.	Do.
24794	1	H3993	Schischmarev Pass, Wotje, 3 miles N.	1,187	36.1	co. s. mang.	Do.
24795	7	H3996	North point of Arhno Atoll, S. 50°, 7 miles E.	1,325	36.0	crs. glob. oz.	Common.
24796	5	H3997	Southwest point of Arhno Atoll 6 miles NE.	1,253	36.0	glob. oz.	Few.

BOLIVINA OCEANICA Cushman

PLATE 7, FIGURE 4

Bolivina oceanica CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 9, p. 81, pl. 8, figs. 10*a*, *b*, 1933; Special Publ. No. 9, p. 147, pl. 19, fig. 31, 1937.

Test small, tapering only at the ends, greatest breadth rather rapidly attained after which the sides are nearly parallel for most of their length, periphery slightly rounded, test in end view elliptical; chambers fairly distinct, not greatly inflated, of rather uniform size and shape in the adult, increasing only slightly in size as added; sutures distinct, very slightly depressed, forming a very slight angle with the horizontal in the early stages and increasing slightly but gradually as chambers are added; wall smooth, distinctly perforate; aperture small, at the base of the inner margin of the last-formed chamber, forming a distinct re-entrant in the apertural face but not strongly contracted at the base. Length, 0.60 mm.; breadth, 0.25 mm.; thickness, 0.12 mm.

The types are from *Albatross* station H3838, lat. 16°57′00″ S., long. 148°58′00″ W., in 2,224 fathoms, vol. m. glob.

This small species has occurred only in the *Albatross* material from the deeper-water stations, no specimens at all having been found in any of the shallow-water stations around any of the islands. It may be distinguished by its straight sutures, nearly parallel sides, and the increase in obliquity of the sutures from the early stages to the adult.

TABLE 10.—*Bolivina oceanica—material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°F.		
24814	1	H3794	Lat. 8°31′00″ S., long. 139°26′00″ W.	1,939	------	gy. yl. oz. crs. glob.	Rare.
24815	1	H3795	Lat. 8°33′00″ S., long. 139°36′00″ W.	1,802	35.5	----do----------	Do.
24816	1	H3796	Haunanu Point, Ua Huku Island, Marquesas, S. 43°, 15½ miles E.	1,040	------	gn. oz. lav.- -----	Do.
24817	2	H3838	Lat. 16°57′00″ S., long. 148°58′00″ W.	2,224	------	vol. m. glob. -----	Do.
24818	1	H3840	Lat. 17°21′00″ S., long. 149°15′00″ W.	1,585	------	vol. m------ ----	Do.
24819	4	H3841	Point Venus, Tahiti Island, S. 32°, 4.2 miles W.	775	------	crs. vol. s. mang. nod.	Few.
24820	5	H3843	Point Venus, Tahiti Island, S. 55°, 3.8 miles E.	807	------	fne. vol. s. m------	Do.
24821	1	H3945	Northeast point Murea Island, 5 miles SW.	981	36.7	crs. vol. s. pter----	Rare.

BOLIVINA NITIDA H. B. Brady

PLATE 7, FIGURE 5

Bolivina nitida H. B. BRADY, Rep. Voy. *Challenger*, Zoology, vol. 9, p. 420, pl. 52, figs. 30*a*, *b*, 1884.—JENSEN, Proc. Linn. Soc. New South Wales, vol. 29, p. 812, 1904.—CUSHMAN, Cushman Lab. Foram. Res. Special Publ. No. 9, p. 136, pl. 17, fig. 25, 1937.

Test elongate, 2½ to 3 times as long as broad, very much compressed; chambers becoming much broader as added, the inner margin high, thence tapering to the acute periphery, periphery slightly rounded or even slightly carinate; sutures distinct, limbate, very little if at all depressed, very strongly oblique backward or slightly sigmoid especially in the later chambers; wall smooth, very finely perforate; aperture large, elongate, taking up nearly the whole of the inner margin of the last-formed chamber. Length, up to 1.00 mm.; breadth, 0.35–0.40 mm.; thickness, 0.10–0.12 mm.

The records for this species are few. It was originally described by Brady from *Challenger* material from East Moncoeur Island, Bass Strait, 38 fathoms, and from off Raine Island, Torres Strait, 155 fathoms. It was recorded as rare at both localities. Jensen's record

for the species is from foraminiferal sand dredged 16 miles east of Wollongong off Australia, at a depth of 100 fathoms. In our present collections the species has occurred as single specimens at two *Albatross* stations as follows: H3989, South Pass, Likieb, ½ mile north, 468 fathoms, 42.6° F., crs. co. s. (U.S.N.M. No. 26731); and H3983, entrance to South Pass, Rongelap, ½ mile north, 400 fathoms, 43.4° F., co. s. (U.S.N.M. No. 26732).

BOLIVINA SEMINUDA Cushman

PLATE 7, FIGURE 6

Bolivina seminuda CUSHMAN, U. S. Nat. Mus. Bull. 71, pt. 2, p. 34, fig. 55 (in text), 1911; Contr. Cushman Lab. Foram. Res., vol. 2, pt. 2, p. 43, 1926; Bull. Scripps Inst. Oceanogr. Tech. Ser., vol. 1, No. 10, p. 157, pl. 3, fig. 6, 1927.—HADA, Trans. Sapporo Nat. Hist. Soc., vol. 11, pt. 1, p. 11, 1929.—CUSHMAN and MOYER, Contr. Cushman Lab. Foram. Res., vol. 6, p. 57, 1930.—HADA, Sci. Rep. Tohoku Imp. Univ., ser. 4, Biol., vol. 6, p. 132, fig. 89 (in text), 1931.—CUSHMAN, Cushman Lab. Foram. Res. Special Publ. No. 9, p. 142, pl. 18, figs. 13–15, 1937.

Test elongate, subcylindrical, very slightly compressed, initial end rounded; chambers numerous, high, very slightly inflated; sutures distinct but not depressed; wall hyaline, the lower half of each chamber with rather coarse foramina, the upper half clear; aperture elongate, loop-shaped; transparent except the lower half of each chamber, which is whitish. Length, up to 1.00 mm.

The original references for this are from the cold waters of the North Pacific as are also the other records. It occurs also in the late Tertiary of California. Specimens apparently identical with this species occur in our present material only at three *Albatross* stations in the eastern part of the area.

TABLE 11.—*Bolivina seminuda—material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°*F.*		
24837	2	H3798	Cape Martin, Nukuhiva Island, N. 30° E., dist. 6½ miles.	687	39.5	drab vol. oz. glob..	Rare.
24838	1	H3804	Entrance to Ahii Lagoon, 2.5 miles southeast.	1,208	.....	lt. gy. oz. glob.....	Do.
24839	1	H3858	Ngaruae Pass, Fakarava Atoll, S. 28°, 1 mile E.	599	.....	crs. co. s.....	Do.

BOLIVINA SPINESCENS Cushman

PLATE 7, FIGURE 7

Bolivina textilarioides H. B. BRADY (part), Rep. Voy. *Challenger*, Zoology, vol. 9, p. 419, pl. 52, figs. 24, 25, 1884 (not *Bolivina textilarioides* Reuss, 1862).—MILLETT, Journ. Roy. Micr. Soc., p. 542, pl. 4, fig. 5, 1900.—BAGG, Proc. U. S. Nat. Mus., vol. 34, p. 137, 1908.

Bolivina spinescens CUSHMAN, U. S. Nat. Mus. Bull. 71, pt. 2, p. 46, 1911.—HERON-ALLEN and EARLAND, *Discovery* Reports, vol. 4, p. 354, pl. 9, figs. 7, 8, 1932.—EARLAND, *Discovery* Reports, vol. 10, p. 132, pl. 6, figs. 8–10, 1934.—CUSHMAN, Cushman Lab. Foram. Res. Special Publ. No. 9, p. 142, pl. 18, figs. 17–19, 1937.

TABLE 12.—*Bolivina spinescens—material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°*F.*		
24840	2	H3804	Entrance to Ahii Lagoon, 2.5 miles SE.	1,208	------	lt. gy. oz. glob-----	Rare.
24841	1	H3805	Lat. 14°42′00″ S., long. 147° 08′00″ W.	1,462	------	lt. gy. oz. glob. frag.	Do.
24842	2	H3812	Entrance to Avatoru Pass, Rahiroa Atoll, 7.5 miles S.	819	------	wh. co. s. glob. oz. vol. part.	Do.
24843	1	H3818	Lat. 15°24′10″ S., long. 147° 56′00″ W.	897	------	glob. pter. vol. part.	Do.
24844	3	H3824	Lat. 15°00′20″ S., long. 148° 30′00″ W.	850	------	wh. pter. glob. oz--	Do.
24845	1	H3826	Lat. 14°56′00″ S., long. 148° 44′00″ W.	711	------	wh. pter. oz------	Do.
24846	10+	H3829	Lat. 14°56′00″ S., long. 148° 48′00″ W.	860	------	wh. co. s. glob. vol. part.	Abundant.
24847	4	H3830	Lat. 15°00′30″ S., long. 148° 47′00″ W.	1,257	------	-----do----------	Few.
24848	1	H3840	Lat. 17°21′00″ S., long. 149° 15′00″ W.	1,585	------	vol. m----------	Rare.
24849	3	H3851	Apataki, south end, 9 miles N.	675	------	pter. oz----------	Do.
24850	1	H3856	Northeast point of Apataki, 7 miles SW.	1,364	------	crs. co. s----------	Do.
24851	1	H3862	Lat. 16°51′00″ S., long. 143° 42′00″ W.	1,300	------	yl. glob. oz-------	Do.
24852	2	H3863	Lat. 16°57′00″ S., long. 145° 49′00″ W.	1,531	------	fne. vol. m. glob---	Do.
24853	2	H3873	Southwest point of Tahanae, N. 68°, 4 miles E.	966	------	glob. oz. mang-----	Do.
24854	1	H3878	Lat. 16°13′00″ S., long. 143° 48′00″ W.	987	------	glob. pter. vol. part.	Do.
24855	1	H3879	Lat. 16°03′00″ S., long. 143° 32′30″ W.	1,084	36.3	gy. yl. glob. oz----	Do.
24856	2	H3881	Lat. 15°54′00″ S., long. 143° 06′00″ W.	1,568	35.4	glob. oz. mang----	Do.
24857	1	H3884	Northwest point of Raroia, ½ mile SE.	508	40.2	crs. co. s. pter. oz--	Do.
24858	2	H3888	Lat. 16°14′00″ S., long. 142° 50′00″ W.	1,516	35.5	glob. oz. mang---	Rare.
24859	1	H3900	Midway between Hikueru and Marokau.	1,372	35.7	glob. oz----------	Do.
24860	1	H3961	Center of south coast of Tarawa, 10 miles N.	413	43.5	crs. br. glob. oz----	Do.
24861	1						
24862	1	H3965	Apaiang Atoll, in line with north point of Tarawa, 2 miles N.	170	51.3	gy. glob. oz-------	Do.

Test elongate, subcylindrical, the apex bluntly pointed; chambers numerous, inflated, the sutures fairly deep, the surface smooth except the portion at and just above the sutures, which is minutely spinose or granular; aperture large, loop-shaped, with a slightly raised border. Length, 0.50–0.75 mm.; breadth, 0.15 mm.; thickness, 0.12 mm.

This species occurs at numerous *Albatross* stations, data for which are given in table 12.

BOLIVINA CAPITATA Cushman

PLATE 8, FIGURES 1–3

Bolivina capitata CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 9, p. 80, pl. 8, figs. 12*a*, *b*, 1933; Cushman Lab. Foram. Res. Special Publ. No. 9, p. 146, pl. 19, fig. 29, 1937.

Test elongate, about 3 times as long as broad, tapering gradually from the subacute initial end to the somewhat swollen apertural end, periphery rounded and somewhat lobulated; chambers numerous, distinctly inflated, especially toward the apertural end; sutures distinct, depressed, strongly oblique; wall smooth, nearly transparent, finely perforate; aperture broadly elliptical, sometimes tending to become terminal. Length, up to 0.50 mm.; breadth, 0.15 mm.; thickness, 0.10 mm.

It has occurred rather commonly at the shallow water stations: 12 and 24 fathoms off Nairai, Fiji, and 12 fathoms off Levuka, Fiji. Specimens were also obtained from 7 fathoms off Rotonga.

BOLIVINA GLOBULOSA Cushman

PLATE 8, FIGURE 4

Bolivina globulosa CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 9, p. 80, pl. 8, figs. 9*a*, *b*, 1933; Cushman Lab. Foram. Res. Special Publ. No. 9, p. 146, pl. 19, fig. 30, 1937.

Test small, elongate, tapering gradually from the subacute initial end to the greatest breadth formed by the last two chambers, periphery rounded; chambers inflated, more or less globose, increasing rather uniformly in size as added; sutures distinct, depressed, somewhat sigmoid, slanting backward but a small amount from the horizontal; wall smooth, finely perforate; aperture comparatively large, at the base of the last-formed chamber and forming a loop-shaped opening. Length of holotype, 0.70 mm.; breadth, 0.40 mm.; thickness, 0.15 mm.

The type is from *Albatross* station H3786, lat. 12°07′00″ N., long. 137°18′00″ W., in 2,883 fathoms, lt. br. rad. oz.

This is a small species but is rather widely distributed in the *Albatross* collections. It has usually not occurred in any considerable numbers at any particular station. The data for these are given in table 13. No specimens were found at any of the shallow-water stations about the various islands.

TABLE 13.—*Bolivina globulosa—material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°F.		
24797	1	H3791	Lat. 7°58′00″ S., long. 139°09′00″ W.	2,287	------	gy. yl. oz. crs. glob.	Rare.
24798	6	H3792	Lat. 8°13′00″ S., long. 139°10′00″ W.	2,267	35.1	-----do-----------	Few.
24799	1	H3794	Lat. 8°31′00″ S., long. 139°26′00″ W.	1,939	------	-----do-----------	Rare.
24800	2	H3795	Lat. 8°33′00″ S., long. 139°36′00″ W.	1,802	35.5	-----do-----------	Do.
24801	1	H3820	Lat. 15°25′50″ S., long. 148°24′25″ W.	1,486	------	glob. oz. vol. part--	Do.
24802	1	H3831	Lat. 15°16′00″ S., long. 148°46′00″ W.	1,762	------	lt. gy. oz. glob-----	Do.
24803	2	H3832	Lat. 15°33′00″ S., long. 148°45′00″ W.	2,267	------	-----do-----------	Do.
24804	2	H3881	Lat. 15°54′00″ S., long. 143°06′00″ W.	1,568	35.4	glob. oz. mang----	Do.
24805	1						

BOLIVINA SUBTENUIS Cushman

PLATE 8, FIGURE 5

Bolivina subtenuis CUSHMAN, Cushman Lab. Foram. Res. Special Publ. No. 6, p. 57, pl. 8, fig. 10, 1936; No. 9, p. 148, pl. 19, figs. 33, 34, 1937.

Bolivina tenuis H. B. BRADY, Quart. Journ. Micr. Sci., vol. 21, p. 57, 1881; Rep. Voy. *Challenger*, Zoology, vol. 9, p. 419, pl. 52, fig. 29, 1884.—CUSHMAN, Carnegie Inst. Washington Publ. 342, p. 17, pl. 5, figs. 7, 8, 1924.

Test much compressed, nearly as broad as long, widest just above the middle; chambers comparatively few, fairly distinct; sutures strongly curved, the inner portion of each chamber showing signs of a subdivision in some cases; wall smooth; aperture at one side, rounded, with a very slight lip. Length, about 0.25 mm.

This seems to be a very rare species described by Brady from 255 fathoms off Kandavu, Fiji, and I have recorded it from stations off Samoa. I have single typical specimens, one from *Albatross* station H3945, northeast point of Murea Island, 5 miles southwest, in 981 fathoms, at 36.7° F., crs. vol. s. pter., the other from Mokaujar Anchorage, Fiji. This seems to be a very distinct but very rare form so far as the records show, being confined to the area of the Fiji and Samoan Islands.

BOLIVINA PSEUDOPYGMAEA Cushman

PLATE 8, FIGURE 6

Bolivina pseudopygmaea CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 9 p. 79, pl. 8, figs. 8*a*, *b*, 1933; Cushman Lab. Foram. Res. Special Publ. No. 9, p. 147, pl. 19, fig. 32, 1937.

Test 1½ to 2 times as long as broad, the early portion tapering and the later portion in the adult often with nearly parallel sides, initial

end subacute, apertural end broadly rounded, periphery acute but not keeled, the early chambers often with short backward-pointing spines; chambers distinct, about as high as broad but much overlapping so that the visible portion of the chamber in the early stages is apparently 2 or 3 times as broad as high; sutures distinct, but only slightly depressed, only slightly oblique; wall nearly transparent except toward the base of the chamber where it becomes opaque due to the large close-set perforations; aperture elongate, comma-shaped. Length, 0.25 mm.; thickness, 0.10 mm.

The types are from *Albatross* station H3989, South Pass, Likieb, ½ mile north, in 468 fathoms, at 42.6° F., crs. co. s.

This is a very distinctive species, occurring in small numbers but at numerous *Albatross* stations, as will be seen in table 14. Its distribution is comparatively limited as the position of these stations shows them all to be in the general region of the Marshall Islands. The only shallow-water station at which the species occurred is that of Rongelap Atoll, Marshall Islands.

TABLE 14.—*Bolivina pseudopygmaea—material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°*F.*		
26709	2	H3961	Center south coast of Tarawa, 10 miles N.	413	43.5	crs. br. glob. oz.	Rare.
26710	1	H3992	Schischmarev Pass, Wotje, 1 mile N.	482	41.7	co. s.	Do.
26711	1	H3978	Wotju Island, Elmore Atoll, 6 miles SE.	1,068	36.5	co. s.	Do.
26712	1	H3983	Entrance to South Pass, Rongelap, ½ mile N.	400	43.4	co. s.	Do.
26713	1	H3984	Entrance to South Pass, Rongelap, 1½ miles N.	746	39.0	crs. co. s.	Do.

BOLIVINA STRIATULA Cushman

PLATE 9, FIGURE 1

Bolivina striatula CUSHMAN, Carnegie Inst. Washington Publ. 311, p. 27, pl. 3, fig. 10, 1922; U. S. Nat. Mus. Bull. 104, pt. 3, p. 43, 1922.—CUSHMAN and PARKER, Proc. U. S. Nat. Mus., vol. 80, art. 3, p. 16, pl. 3, figs. 21*a*, *b*, 1931.—COLE, Florida State Geol. Survey Bull. 6, p. 41, pl. 2, fig. 9, 1931.—CUSHMAN, Cushman Lab. Foram. Res. Special Publ. No. 9, p. 154, pl. 18, figs. 30, 31, 1937.

Test elongate, about 3 times as long as broad, much compressed, microspheric form tapering throughout, megalospheric form often with the adult portion of the test with the sides nearly parallel, periphery rounded; chambers numerous, distinct, very slightly inflated, earlier ones much broader than high, relative height increasing

toward the apertural end, where height and breadth are often about equal; sutures distinct, slightly limbate, obliquely curved, forming an angle of about 30°–40° with the horizontal, slightly depressed in the adult portion; wall finely perforate, smooth, except for the early portion, which has numerous, fine, longitudinal costae, sometimes running up halfway of the length of the test; aperture elongate, narrow at the base, and somewhat expanded at the upper end. Length, 0.35 mm.; breadth, 0.10 mm.; thickness, 0.03–0.04 mm.

This species has previously been known only from the Atlantic, but typical specimens occur commonly at Vavau Anchorage, Tonga Island; in Niau Lagoon and off Niau; 12 fathoms off Nairai, Fiji; and slightly less common inside the lagoon at Pinaki Atoll. There is a single record for it in the *Albatross* material at station H3915, Pinaki Atoll, 3.5 miles southeast, in 860 fathoms, 37.0° F., glob. mang.

BOLIVINA SUBRETICULATA Parr

PLATE 9, FIGURE 2

Bolivina reticulata H. B. BRADY (not Hantken), Rep. Voy. *Challenger*, Zoology, vol. 9, p. 426, pl. 53, figs. 30, 31, 1884.—EGGER, Abh. kön. bay. Akad. Wiss. München, Cl. II, vol. 18, p. 295, pl. 8, figs. 33, 34, 1893.—MILLETT, Journ. Roy. Micr. Soc., 1900, p. 547.—CHAPMAN, Journ. Linn. Soc. Zool., vol. 30, p. 405, 1910.—PEARCEY, Trans. Roy. Soc. Edinburgh, vol. 49, p. 1013, 1914.—HERON-ALLEN and EARLAND, British Antarctic Exped., Zool., vol. 6, p. 135 [?], 1922.—HANZAWA, Jap. Journ. Geol. Pal., vol. 4, p. 39 (list), 1925 (1926).—YABE and HANZAWA, Jap. Journ. Geol. Pal., vol. 4, p. 50, 1925 (1926).—CHAPMAN, New Zealand Geol. Survey Pal. Bull. 11, p. 40, pl. 9, fig. 5, 1926.

Bolivina subreticulata PARR, Proc. Roy. Soc. Victoria, vol. 44, p. 12, pl. 1, figs. 21*a*, *b*, 1932.—CUSHMAN, Cushman Lab. Foram. Res. Special Publ. No. 9, p. 148, pl. 19, figs. 24–26, 1937.

Test small, in front view rhomboid, thickest along the median line and with sharp edges; chambers numbering about fourteen in the megalospheric form, but more in the microspheric form, much longer than wide, slightly inflated in the later portion of the test; sutures distinct, limbate, sinuous, with processes of varying length on the

TABLE 15.—*Bolivina subreticulata—material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°F.		
24822	1	H2809	Entrance to Avatoru Pass, Rahiroa Atoll, 2.5 miles S.	645	------	fne. wh. co. s------	Rare.
24823	2	H3826	Lat. 14°56′00″ S., long. 148° 44′00″ W.	711	------	wh. pter. oz------	Do.
24824	2	H3954	West end Nomuka Island, N. 33°, 6 miles East.	600	39.2	co. s. pum. pter. oz.	Do.

posterior margin; wall calcareous, finely perforate, and ornamented in the early part of the test with a few irregular costae, later with a network of raised lines formed by the projecting processes extending more or less across the face of each chamber; aperture bolivine, elongate-oval; color white. Length, up to 0.45 mm.; breadth, 0.40 mm.

This species occurred at three *Albatross* stations in this Pacific material, as listed in table 15.

BOLIVINA VARIABILIS (Williamson)

PLATE 9, FIGURE 3

Textularia variabilis WILLIAMSON, Rec. Foram. Great Britain, p. 76, pl. 6, figs. 162, 163, 1858.

Bolivina variabilis CHASTER, 1st Rep. Southport Soc. Nat. Sci., pp. 59, 69, 1890–1891 (1892).—HERON-ALLEN and EARLAND, Journ. Roy. Micr. Soc., 1909, p. 336; Proc. Roy. Irish Acad., vol. 31, pt. 64, p. 68, 1913; Journ. Roy. Micr. Soc., 1916, p. 43; Trans. Linn. Soc. London, ser. 2, vol. 11, p. 240, 1916.—CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 3, p. 49, pl. 4, figs. 3*a*, *b*, 1922.—HERON-ALLEN and EARLAND, Journ. Roy. Micr. Soc., 1930, p. 81.—CUSHMAN, Cushman Lab. Foram. Res. Special Publ. No. 9, p. 158, pl. 16, figs. 6, 12–14, 1937.

Test of the early portion somewhat compressed, later more inflated, periphery rounded but toward the apertural end occasionally somewhat compressed at the margin, even appearing carinate, the width increasing very gradually toward the apertural end; early chambers low, close set, not inflated, later ones high and more inflated; sutures of the early portion slightly limbate, later becoming depressed and somewhat sigmoid; wall smooth but very coarsely perforate; aperture elongate, slightly loop-shaped, at the base of the inner margin of the last-formed chamber. Length, up to 1.30 mm.; breadth, 0.45 mm.; thickness, 0.20 mm.

The species is abundant in Niau Lagoon and rare off Fiji, 40–50 fathoms, and rare also at Vavau Anchorage, Tonga Islands. There

TABLE 16.—*Bolivina variabilis—material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	° *F.*		
24730	1	H3796	Haunanu Point, Ua Huku Island, Marquesas, S. 43°, 15½ miles E.	1,040	------	gn. oz. lav----------	Rare.
24731	1	H3853	Pakaka entrance to Apataki Lagoon, N. 50°, 2 miles E.	613	39.4	co. vol----------	Do.
24732	1	H3894	Midway between Marutea and Nihiru Islands.	1,135	36.0	glob. oz----------	Do.

are three records for the species from the *Albatross* material in deeper water, which are given in table 16. This seems to be identical with Williamson's species, which occurs typically off the British Isles but has been widely recorded elsewhere.

BOLIVINA cf. PAULA Cushman and Cahill

PLATE 9, FIGURE 4

Bolivina paula CUSHMAN and CAHILL, MS., *in* Cushman and Ponton, Florida State Geol. Survey Bull. 9, p. 84, pl. 12, figs. 6*a*, *b*, 1932.—CUSHMAN and CAHILL, U. S. Geol. Surv. Prof. Paper 175A, p. 26, pl. 8, figs. 14*a*, *b*, 1933.—CUSHMAN, Cushman Lab. Foram. Res. Special Publ. No. 9, p. 91, pl. 11, fig. 9, 1937.

Test minute, about 3 times as long as broad, much compressed, periphery subacute, sides for the most part nearly parallel, initial end tapering; chambers numerous, often 12 or more pairs in the adult test, increasing somewhat in height as added, some of the earliest ones being very low; sutures distinct, very slightly if at all depressed, slightly limbate, rather strongly curved backward; wall smooth, finely perforate; aperture an elongate, somewhat comma-shaped opening; in the median line of the apertural face. Length, 0.30–0.35 mm. breadth, 0.15 mm.; thickness, 0.06–0.08 mm.

This species has been known hitherto only from the Miocene of America. The specimen here figured is from Makemo Lagoon, Paumotu Islands, and seems identical.

BOLIVINA ABBREVIATA Heron-Allen and Earland

PLATE 9, FIGURE 5

Bolivina limbata H. B. BRADY var. *abbreviata* HERON-ALLEN and EARLAND, Journ. Linn. Soc. Zool., vol. 35, p. 622, pl. 36, figs. 25–27, 1924.
Bolivina abbreviata CUSHMAN, Cushman Lab. Foram. Res. Special Publ. No. 9, p. 143, pl. 18, figs. 34, 35, 1937.

Test usually short and stout, 1½–2½ times as long as broad, somewhat compressed, periphery in end view broadly rounded, early portion increasing rapidly in breadth, in the adult with the sides nearly parallel; chambers distinct, early ones nearly 2–3 times as long as broad, increasing in relative height, until, in the adult, the height and breadth may be about equal, slightly if at all inflated; sutures distinct, slightly limbate, usually slightly curved, forming an angle of 20°–35° with the horizontal; wall smooth, rather coarsely perforate, the perforations tending to become arranged in definite lines; aperture narrow, elongate, opening at the inner edge of the last-formed chamber. Length, 0.25–0.30 mm.; breadth, 0.15 mm.; thickness, 0.10 mm.

The types of this species are from off Lord Howe Island in the Pacific. It also is recorded from off Raine Island, Torres Straits, in 155 fathoms. Our figured specimen is longer than the other specimens

figured previously, but the early portion is entirely typical. In the *Albatross* material it has occurred at station H3989, South Pass, Likieb, ½ mile north, in 468 fathoms, and at H3978, Wotju Island, Elmore Atoll, 6 miles southeast, in 1,068 fathoms.

BOLIVINA LIGULARIA Schwager

PLATE 9, FIGURES 6, 7

Bolivina ligularia SCHWAGER, *Novara*-Exped. Geol. Theil, vol. 2, p. 25, pl. 7, fig. 102, 1866—CUSHMAN, Cushman Lab. Foram. Res. Special Publ. No. 9, p. 14, pl. 14, figs. 3–5, 1937.

Test elongate, two or three times as long as broad, initial end subacute, apertural end broadly rounded, sides of the adult nearly parallel but slightly lobulate, compressed, periphery rounded; chambers distinct, not inflated, about as high as broad; sutures distinct, very slightly depressed, only slightly oblique; wall smooth, nearly transparent; aperture broadly elliptical. Length of Recent specimen, 0.40 mm.

This species was originally described by Schwager from the Pliocene of Kar Nicobar.

The *Albatross* material yields two specimens: U.S.N.M. No. 24811, from station H3829, lat. 14° 56′ 00″ S., long. 148° 48′ 00″ W., 860 fathoms, wh. co. s. glob. vol. part.; and U.S.N.M. No. 24813, from station H3900, midway between Hikueru and Marokau, 1,372 fathoms, 35.7°F., glob. oz.

Genus LOXOSTOMA Ehrenberg, 1854

Loxostomum EHRENBERG, Mikrogeologie, pl. 27, fig. 19, 1854.—CUSHMAN, Cushman Lab. Foram. Res. Special Publ. No. 1, p. 252, 1928.
Loxostoma HOWE, Journ. Pal., vol. 4, p. 329, 1930.
Proroporus (part) of authors (not Ehrenberg, 1854).
Bolivina (part) of authors.

Genotype.—By designation, *Loxostomum subrostratum* Ehrenberg.

Test elongate, usually compressed, early portion often slightly twisted; early chambers biserial with the aperture as in *Bolivina* at the base of the apertural face, but in the adult tending to become uniserial and the aperture failing to reach the base of the chamber, finally becoming terminal. Cretaceous to Recent.

This genus represents a further development from *Bolivina*, in which the aperture becomes terminal at the same time that the chambers become uniserial, a combination of the chambers seen in a great many other groups of Foraminifera.

There are a number of well-characterized species in the Pacific material, some of which also exist in the West Indian region of the Atlantic.

LOXOSTOMA LIMBATUM (H. B. Brady)

PLATE 10, FIGURE 1

Bolivina limbata H. B. BRADY, Quart. Journ. Micr. Sci., vol. 21, p. 27, 1881; Rep. Voy. *Challenger*, Zoology, vol. 9, p. 419, pl. 52, figs. 26–28, 1884; Quart. Journ. Geol. Soc., vol. 44, p. 8 (table), 1888.—HOWCHIN, Trans. Proc. Roy. Soc. South Australia, vol. 12, p. 8, 1889.—CHAPMAN, Proc. Zool. Soc. London, 1895, p. 23.—MILLETT, Journ. Roy. Micr. Soc., 1900, p. 543.—CHAPMAN, Journ. Linn. Soc. Zool., vol. 28, pp. 187, 382, 1900–1902.—SIDEBOTTOM, Mem. Proc. Manchester Lit. Philos. Soc., vol. 48, pt. 2, p. 15, 1904; vol. 49, No. 5, p. 15, 1905.—DAKIN, Rep. Ceylon Pearl Oyster Fish., vol. 5, p. 234, 1906.—CHAPMAN, Journ. Linn. Soc. Zool., vol. 30, p. 32, pl. 4, fig. 83, 1907.—BAGG, Proc. U. S. Nat. Mus., vol. 34, p. 138, 1908.—SIDEBOTTOM, Mem. Proc. Manchester Lit. Philos. Soc., vol. 54, pt. 3, p. 13, 1910.—CHAPMAN, Journ. Linn. Soc. Zool., vol. 30, p. 404, 1910; Proc. Roy. Soc. Victoria, vol. 22, p. 275, 1910.—CUSHMAN, U. S. Nat. Mus. Bull. 71, pt. 2, p. 47, fig. 78, 1911; Carnegie Inst. Washington Publ. 291, p. 33, 1919; U. S. Nat. Mus. Bull. 100, vol. 4, p. 135, pl. 19, fig. 5, 1921.—HERON-ALLEN and EARLAND, British Antarctic Exped., Zoology, vol. 6, p. 137, 1922.—CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 3, p. 36, pl. 7, fig. 3, 1922.—HERON-ALLEN and EARLAND, Journ. Linn. Soc. Zool., vol. 35, p. 622, 1924; Journ. Roy. Micr. Soc., 1924, p. 145.—CUSHMAN, B. P. Bishop Mus. Bull. 27, p. 125, 1925 (1926).—CHAPMAN, New Zealand Geol. Survey Pal. Bull. 11, p. 40, pl. 9, fig. 6, 1926; Rep. Great Barrier Reef Comm., vol. 3, pp. 38, 39 (lists), 1931.

Loxostoma limbatum CUSHMAN, Cushman Lab. Foram. Res. Special Publ. No. 9, p. 186, pl. 21, figs. 26–29, 1937.

Test elongate, 3 or 4 times as long as broad, much compressed, tapering at the ends, the middle portion with the sides nearly parallel, thickest along the median line thence thinning toward the lateral margins which are subacute, the whole test usually somewhat twisted; chambers rapidly increasing in height as added until in the adult they are as high as wide, slightly inflated; sutures very distinct, strongly limbate, rather strongly curved backward; wall calcareous, smooth, coarsely perforate; aperture elongate, oval, in the adult becoming terminal. Length, up to about 1.00 mm.; breadth, 0.35–0.40 mm.; thickness, 0.20–0.25 mm.

This species is a common one in the Indo-Pacific region and also occurs in typical form but much more rarely in the West Indian region. Many records for this species, especially those without figures, make it difficult to determine whether they are typical or belong to some of the varieties. In our material the typical form of the species has been rare, occurring only at Levuka, Fiji, in 12 fathoms, and from two *Albatross* stations: H3830, lat. 15°00′30″ S., long. 148°47′00″ W., in 1,257 fathoms, wh. co. s. glob. vol. part., and H3984, entrance to South Pass, Rongelap, 1½ miles north in 746 fathoms, 39° F., ers. co. s. The following variety is much more common.

LOXOSTOMA LIMBATUM (H. B. Brady) var. COSTULATUM (Cushman)

PLATE 10, FIGURES 2–4

Bolivina limbata CHAPMAN, Journ. Linn. Soc. Zool., vol. 28, p. 409, pl. 36, fig. 12, 1901.—HERON-ALLEN and EARLAND, Trans. Zool. Soc. London, vol. 20, p. 646, pl. 50, figs. 1–4, 1915.

Bolivina limbata (H. B. BRADY) var. *costulata* CUSHMAN, Carnegie Inst. Washington Publ. 311, p. 26, pl. 3, fig. 8, 1922; U. S. Nat. Mus. Bull. 104, pt. 3, p. 37, 1922; Carnegie Inst. Washington Publ. 342, p. 19, pl. 5, figs. 2, 3, 6, 1924; Publ. 344, p. 76, 1926; B. P. Bishop Mus. Bull. 27, p. 125, 1925 (1926).

Loxostoma limbata (H. B. BRADY) var. *costulata* PALMER and BERMUDEZ, Mem. Soc. Cubana Hist. Nat., vol. 9, p. 248, 1935.—CUSHMAN, Cushman Lab. Foram. Res. Special Publ. No. 8, p. 187, pl. 21, figs. 30, 31, 1937.

Variety differing from the typical form of the species mainly in the addition of longitudinal costae usually few in number and mostly near the base of the test. Length, up to 2.00 mm.; breadth, 0.40 mm.; thickness, 0.20 mm.

This variety is much commoner than the typical form wherever the species occurs and often has a larger test and is usually strongly twisted. In our Pacific material this variety has occurred most abundantly at Guam Anchorage, Ladrone Islands, in 21 fathoms, but specimens also occur at Nairai, Fiji, 24 fathoms; Vavau Anchorage, Tonga Islands, 18 fathoms; Rotonga, 7 fathoms; Rangiroa; and also at the *Albatross* stations in deeper water given in table 17.

TABLE 17.—*Loxostoma limbatum* var. *costulatum*—*material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°F.		
24900	1	H3790	Lat. 6°25′00″ S., long. 138°59′00″W.	2,475	35.0	lt. gy. glob. oz	Rare.
24901	1	H3815	Lat. 15°15′00″ S., long. 147°51′35″ W.	524	------	wh. co. s. brk. sh	Do.
24902	1	H3941	Southeast point of Mehetia Island, 1.25 miles NW.	832	38.1	vol. co. s	Do.
24903	1	H3993	Schischmarev Pass, Wotje, 3 miles N.	1,187	36.1	co. s. mang	Do.

LOXOSTOMA LOBATUM (H. B. Brady)

PLATE 10, FIGURE 5

Bolivina lobata H. B. BRADY, Quart. Journ. Micr. Sci., vol. 21, p. 28, 1881; Rep. Voy. *Challenger*, Zoology, vol. 9, p. 425, pl. 53, figs. 22, 23, 1884.—MILLETT, Journ. Roy. Micr. Soc., 1900, p. 543, pl. 1, fig. 4.—CUSHMAN, U. S. Nat. Mus. Bull. 71, pt. 2, p. 46, figs. 74, 75, 1911.

Loxostoma lobatum CUSHMAN, Cushman Lab. Foram. Res. Special Publ. No. 9, p. 188, pl. 22, figs. 2–4, 1937.

Test elongate, somewhat compressed, periphery lobed, early portion tapering, remainder of the test with the breadth rather uniform; chambers distinct, the early ones rather uniformly increasing in size as added, later ones becoming more inflated and more distinctly separated; sutures distinct, depressed, strongly oblique, nearly straight; wall ornamented by a distinct raised ridge somewhat above the suture, the periphery of which is often toothed and the later chambers somewhat roughened; aperture elongate, terminal in the adult, with a slight lip. Length, 0.75 mm.; breadth, 0.40 mm.; thickness, 0.25 mm.

Most of the records for this species are from the Indo-Pacific region. The types were from off New Guinea. There are a number of other records from this same general region some of which have no figures accompanying them. There are also other records for the species from other areas both fossil and Recent, but the figures accompanying these records show rather distinctly that they are not the same as this Indo-Pacific species of Brady. The only specimen of this species that we have from this area is from the Paumotu Islands, *Albatross* station H3870, village, point of Anaa Atoll, S. 50°, 5 miles west, in 1,110 fathoms, 36.0° F., fne.co.s.pter.oz.glob.

LOXOSTOMA CONVALLARIUM (Millett)

PLATE 10, FIGURE 6

Bolivina convallaria MILLETT, Journ. Roy. Micr. Soc., 1900, p. 544, pl. 4, figs. 6*a*, *b*.—HERON-ALLEN and EARLAND, Trans. Zool. Soc. London, vol. 20, p. 647, 1915.

Loxostoma convallarium CUSHMAN, Cushman Lab. Foram. Res. Special Publ. No. 9, p. 191, pl. 22, figs. 11–13, 1937.

Loxostoma vertebrale CUSHMAN (in part), *ibid.*, p. 194.

Test very elongate, slender, about 4 times as long as broad, periphery serrate in front view, rounded in end view; chambers distinct, inflated, as high as broad throughout, early ones smooth except for a spine at the peripheral angle, later ones very deeply excavated on the lower side and crenulate at the border, tending to become somewhat uniserial in the adult; sutures distinct, depressed, very strongly so in the adult, oblique; wall of early portion smooth, later portion smooth except for the crenulate border; aperture elongate, oval, with a distinct lip, tending to become terminal.

This species is close to *L. vertebrale* (Cushman), and the two may be easily confused. *L. convallarium* occurs in our shallow water collections from off Fiji, 40–50 fathoms; off Nairai, 12 fathoms; off Levuka, 12 fathoms; and Rotonga, 7 fathoms.

LOXOSTOMA VERTEBRALE (Cushman)

Bolivina vertebralis CUSHMAN, Carnegie Inst. Washington Publ. 342, p. 20, pl. 3, figs. 3, 4, 1924.

Loxostoma vertebrale CUSHMAN, Cushman Lab. Foram. Res. Special Publ. No. 9, p. 194, pl. 22, figs. 14, 15, 1937.

Test very elongate, slender, 5 to 6 times as long as broad, tapering from the subacute initial end, but very gradually, much twisted, in some adult specimens making a complete turn, periphery lobulate; chambers numerous, distinct, somewhat inflated, in the adult higher than broad, basal margin in the adult typically projecting above the previous chamber; sutures distinct, somewhat limbate in the early portion, deeply depressed in the adult; wall in the early stages with indistinct, longitudinal costae, in the later chambers smooth, except near the lower margin, which has numerous, very short, fine spines; aperture in the adult tending to become terminal, elongate, curved, with a slight lip. Length, up to 0.75 mm.; breadth, 0.15 mm.

A few specimens occurred in our material from Vavau Anchorage, Tonga Islands, 18 fathoms; from Rotonga, 7 fathoms; and from off Nairai, 12 fathoms. The species is easily confused with *L. convallarium* (Millett).

LOXOSTOMA KARRERIANUM (H. B. Brady) var. CARINATUM (Millett)

PLATE 10, FIGURE 7

Bolivina karreriana H. B. BRADY var. *carinata* MILLETT, Journ. Roy. Micr. Soc., 1900, p. 546, pl. 4, figs. 8*a*, *b*.—CUSHMAN, U. S. Nat. Mus. Bull. 71, pt. 2, p. 41, figs. 66*a*, *b*, 1911; Bull. 100, vol. 4, p. 132, pl. 27, fig. 1, 1921.—HANZAWA, Jap. Journ. Geol. Pal., vol. 4, p. 39 (table), 1925 (1926).

Loxostoma karrerianum (H. B. BRADY) var. *carinatum* CUSHMAN, Cushman Lab. Foram. Res. Special Publ. No. 9, p. 186, pl. 21, figs. 18–20, 1937.

Variety differing from the typical in the much greater depression of the whole test, the periphery acute and carinate, aperture elongate.

The only station at which this variety was represented is *Albatross* H3896, Tekokoto Atoll, 1 mile east, Paumotu Islands, 617 fathoms.

LOXOSTOMA MAYORI (Cushman)

PLATE 11, FIGURES 1, 2

Bolivina mayori CUSHMAN, Carnegie Inst. Washington Publ. 311, p. 27, pl. 3, figs. 5, 6, 1922; U. S. Nat. Mus. Bull. 104, pt. 3, p. 40, 1922; Carnegie Ints. Washington Publ. 342, p. 19, pl. 6, figs. 3, 4, 1924; Publ. 344, p. 76, 1926.

Loxostoma mayori BERMUDEZ, Mem. Soc. Cubana Hist. Nat., vol. 9, p. 197, 1935.—CUSHMAN, Cushman Lab. Foram. Res. Special Publ. No. 9, p. 195, pl. 22, figs. 16–21, 1937.

Test elongate, slender, often arcuate or somewhat twisted, somewhat compressed, periphery rounded, the early portion somewhat tapering but later with the sides nearly parallel throughout their length; chambers numerous, distinct, becoming gradually higher as added until in the later development the height becomes greater than the breadth, and the last-formed chambers uniserial but usually with oblique sutures and somewhat more rounded in form than the early portion; sutures

distinct, limbate, slightly depressed, more so in the later portion, in the early portion oblique and nearly straight, later becoming sigmoid as the chambers tend to become uniserial; wall coarsely perforate, the perforations often in longitudinal lines and the surface with a few short, weakly developed costae; aperture in the adult terminal, narrowly elliptical, often with a slight, rounded lip. Length, up to 2.00 mm.; breadth, 0.30 mm.; thickness, 0.20 mm.

The figured specimens are from off Nairai, Fiji, in 24 fathoms, where the species is very common and well developed. It also occurs off Levuka, Fiji, 12 fathoms; Viva Anchorage, Fiji, 3 fathoms; Mokaujar Anchorage, Fiji; Vavau Anchorage, Tonga Islands, 18 fathoms; Guam Anchorage, Ladrone Islands, 21 fathoms; Port Lotten, Kersail, Caroline Islands, and at one *Albatross* station, H3840, lat. 17°21′00″ S., long. 149°15′00″ W., in 1,585 fathoms, vol. m. Judged from the fact that this is typically a shallow-water species probably these specimens in the *Albatross* collections represent individuals carried by the currents and deposited in deeper water, a frequent occurrence about oceanic islands.

LOXOSTOMA ROSTRUM Cushman

PLATE 11, FIGURES 3, 4

Loxostoma rostrum CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 9, p. 82, pl. 8, figs. 13*a*, *b*, 1933; Cushman Lab. Foram. Res. Special Publ. No. 9, p. 195, pl. 22, figs. 3, 4, 1937.

Test small, elongate, about three times as long as broad, the early portion rapidly expanding but the remainder of the test with the sides nearly parallel, the last-formed chamber somewhat produced, periphery broadly rounded; chambers fairly distinct, only slightly inflated in the later portion, increasing rather rapidly in height toward the

TABLE 18.—*Loxostoma rostrum—material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°*F.*		
24907	1	H3826	Lat. 14°56′00″ S., long. 148° 44′00″ W.	711	------	wh. pter. oz -------	Rare.
24908	1	H3827	Lat. 14°53′20″ S., long. 148° 42′30″ W.	486	------	crs. wh. co. s. vol. part.	Do.
24909	6	H3838	Lat. 16°57′00″ S., long. 148° 58′00″ W.	2,224	------	vol. m. glob-------	Few.
24910	3	H3840	Lat. 17°21′00″ S., long. 149° 15′00″ W.	1,585	------	vol. m----------	Rare.
24911	1	H3850	Niau Atoll, S. 3°, 14 miles E....	677	------	co. s. glob. oz------	Do.
24912	1	H3915	Pinaki Atoll, 3.5 miles SE.	860	37.0	glob. mang-------	Do.
24913	1	H3945	Northeast point of Murea Island, 5 miles SW.	981	36.7	crs. vol. s. pter-----	Do.

apertural end; sutures fairly distinct, very slightly depressed toward the apertural end, becoming gradually more oblique as chambers are added; wall smooth, very finely perforate; aperture in the adult terminal, ovate, without a distinct lip. Length, 0.75 mm.; breadth, 0.25 mm.; thickness, 0.15 mm.

The types of this species are from *Albatross* station H3840, lat. 17°21′00″ S., long. 149°15′00″ W., in 1,585 fathoms, vol. m.

While it has not occurred in any considerable numbers, nevertheless it has been found from a number of different stations at which the characters of the species are held rather uniformly. From the records it seems to be a species of comparatively deep water and did not occur in any of the material from the shallow water about the various islands.

Subfamily REUSSELLINAE

Genus REUSSELLA Galloway, 1933

Reussella GALLOWAY, Man. Foram., p. 360, 1933.

Genoholotype.—Verneuilina spinulosa Reuss.

Test distinctly triserial, triangular in transverse section, broadest at the apertural end; wall calcareous, finely or coarsely perforate; aperture elongate, oblique, from the base of the chamber in the apertural face. Cretaceous to Recent.

REUSSELLA SPINULOSA (Reuss)

PLATE 11, FIGURES 5–8

Verneuilina spinulosa REUSS, Denkschr. Akad. Wiss. Wien, vol. 1, p. 374, pl. 47, fig. 12, 1850.—EGGER, Neues Jahrb., 1857, p. 292, pl. 9, figs. 17, 18.—H. B. BRADY, Rep. Voy. *Challenger*, Zoology, vol. 9, p. 384, pl. 47, figs. 1–3, 1884.—BALKWILL and WRIGHT, Trans. Roy. Irish Acad., vol. 28, p. 333, 1885.—H. B. BRADY, Journ. Roy. Micr. Soc., 1887, p. 896.—H. B. BRADY, PARKER, and JONES, Trans. Zool. Soc. London, vol. 12, p. 219, pl. 42, fig. 15 (not fig. 14), 1888.—WRIGHT, Proc. Roy. Irish Acad., ser. 3, vol. 1, p. 472, 1891.—DAKIN, Rep. Ceylon Pearl-Oyster Fish., vol. 5, p. 233, 1896.—CHAPMAN, Journ. Linn. Soc. London, vol. 28, p. 185, 1900.—MILLETT, Journ. Roy. Micr. Soc., 1900, p. 11.—SIDEBOTTOM, Mem. Proc. Manchester Lit. Philos. Soc., vol. 49, No. 5, p. 10, pl. 2, fig. 5, 1905.—RHUMBLER, Zool. Jahrb. Abt., Syst., vol. 24, p. 61, pl. 5, fig. 53, 1906.—BAGG, Proc. U. S. Nat. Mus., vol. 34, p. 132, 1908.—HERON-ALLEN and EARLAND, Journ. Roy. Micr. Soc., 1908, p. 327.—SIDEBOTTOM, Mem. Proc. Manchester Lit. Philos. Soc., vol. 54, pt. 3, p. 11, 1910.—CHAPMAN, Journ. Linn. Soc. London, vol. 30, p. 402, 1910.—CUSHMAN, U. S. Nat. Mus. Bull. 71, pt. 2, p. 55, figs. 88*a*, *b*, 89, 1911.—PEARCEY, Trans. Linn. Soc. Edinburgh, vol. 49, p. 1039, 1914.—CHAPMAN, Biol. Res. *Endeavour*, vol. 3, pt. 1, p. 311, 1915; Australian Geol. Survey Bull. 72, p. 13, 1917.—SIDEBOTTOM, Journ. Roy. Micr. Soc., 1918, p. 22.—CUSHMAN, Carnegie Inst. Washington Publ. 291, p. 34, 1919; Proc. U. S. Nat. Mus., vol. 59, p. 51, 1921; U. S. Nat. Mus. Bull. 100, vol. 4, p. 141, pl. 27, fig. 5, 1921; Carnegie Inst. Washington Publ. 311, p. 28, pl. 3, fig. 11, 1922.—HERON-ALLEN and EARLAND, British Antarctic

Exped., Zool., vol. 6, p. 124, 1922; Journ. Roy. Micr. Soc., 1924, p. 138; Journ. Linn. Soc. Zool., vol. 35, p. 619, 1924.—Chapman, Union of South Africa Fish. Mar. Biol. Survey Rep. No. 3 (1922), p. 11, 1924.—Cushman, Carnegie Inst. Washington Publ. 342, p. 21, 1924.—Hanzawa, Jap. Journ. Geol. Pal., vol. 4, p. 39 (table), 1925 (1926).—Cushman, Carnegie Inst. Washington Publ. 344, p. 76, 1926.—Koch, Ber. Schweiz. Pal. Ges., vol. 19, p. 726 (list), 1926.—Hada, Trans. Sapporo Nat. Hist. Soc., vol. 11, pt. 1, p. 11, 1929.—Macfadyen, Geol. Survey Egypt, p. 51, pl. 1, figs. 8*a*, *b*, 1930 (1931).

Reussia spinulosa Schwager, Boll. Com. Geol. Ital., vol. 8, p. 26, 1877.—Cushman, Contr. Cushman Lab. Foram. Res., vol. 3, pt. 1, p. 68, pl. 14, fig. 16, 1927; Cushman Lab. Foram. Res. Special Publ. No. 1, p. 253, pl. 36, fig. 14; pl. 37, fig. 14, 1928.—Cushman and Kellett, Proc. U. S. Nat. Mus., vol. 75, art. 25, p. 9, pl. 3, figs. 10*a*, *b*, 1929.—Cushman, Florida State Geol. Survey Bull. 4, p. 48, pl. 8, figs. 17*a*, *b*, 1930.—Cole, Florida State Geol. Survey Bull. 6, p. 43, pl. 2, fig. 6, 1931.—Hada, Sci. Rep. Tohoku Imp. Univ., ser. 4, Biol., vol. 6, p. 133, fig. 90, 1931.—Cushman and Ponton, Florida State Geol. Survey Bull. 9, p. 84, pl. 12, figs. 14–16, 1932.—Cushman and Cahill, U. S. Geol. Surv. Prof. Paper 175A, p. 27, pl. 9, figs. 1*a*, *b*, 1933.

Reussella spinulosa Galloway, Man. Foram., p. 360, pl. 33, fig. 4, 1933.—Cushman, Cushman Lab. Foram. Res. Special Publ. No. 4, pl. 22, fig. 17, 1933; No. 5, pl. 28, figs. 4*a–c*, 1933.—Bermudez, Mem. Soc. Cubana Hist. Nat., vol. 9, p. 197, 1935.—Hadley, Journ. Elisha Mitchell Sci. Soc., vol. 52, No. 1, p. 36, 1936.—Yabe and Asano, Science Rep. Tohoku Imp. Univ., ser. 2 (Geol.), vol. 19, No. 1, p. 122 (36), 1937.—Asano, Saito Ho-on Kai Mus. Res. Bull. 13, p. 116, pl. 16, fig. 3, 1937.—Chapman and Parr, Australasian Antarctic Exped., ser. C, vol. 1, pt. 2, p. 94, 1937.

Test pyramidal, 3-sided, triangular in transverse section, angles of the test usually acute, the sides flat or slightly concave, initial end acutely pointed, initial end and angles of chambers often with sharp spines more or less strongly developed; sutures distinct, often limbate, usually not raised but occasionally strongly so; wall of medium thickness, calcareous, hyaline, usually distinctly perforate, in some cases thickened and the surface roughened, occasionally with definite beadlike ornamentation near the periphery of the chamber; apertural end of test bluntly angled, the edges of the chambers thickened, the aperture itself a curved slit at the base of the inner margin of the chamber. Length, up to 1 mm.; breadth, 0.50–0.70 mm.

This species is a very variable one especially in the amount of spines ornamenting the test. It is a widely distributed species, occurring at least as far back as the Miocene and being widely distributed at the present time particularly in rather shallow water. In the Pacific material it has occurred at numerous *Albatross* stations, data for which are given in table 19. In the shallow water material it has occurred about Fiji near Nairai, 12 and 24 fathoms; off Levuka, Fiji, 12 fathoms; Viva Anchorage, Fiji, 3 fathoms; Mokaujar Anchorage, Fiji; and at the deeper station 40-50 fathoms off Fiji. It has

also occurred at Vavau Anchorage, Tonga Islands, 18 fathoms; Pinaki Island, Paumotu Islands; Makemo Lagoon, Paumotu Islands; off Rotonga, 7 fathoms; Rongelap Atoll, Marshall Islands; off Rangiroa, 21 fathoms; Guam Anchorage, Ladrone Islands; and at Port Lotten, Kersail, Caroline Islands.

TABLE 19.—*Reussella spinulosa—material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°F.		
27292	2	H3804	Entrance to Ahii Lagoon, 2.5 miles SE.	1,208	------	lt. gy. oz. glob----	Rare.
27293	1	H3809	Entrance to Avatoru Pass, Rahiroa Atoll, 2.5 miles S.	645	------	fne. wh. co. s------	Do.
27294	1	H3813	Lat. 15°13′10″ S., long. 147° 53′10″ W.	341	------	wh. co. s. glob. pter.	Do.
27295	1	H3814	Lat. 15°14′10″ S., long. 147° 51′05″ W.	391	------	wh. co. s. sh. glob--	Do.
27296	1	H3815	Lat. 15°15′00″ S., long. 147° 51′35″ W.	524	------	wh. co. s. brk. sh--	Do.
27297	1	H3816	Lat. 15°16′50″ S., long. 147° 52′30″ W.	450	------	pter. oz. vol. part -	Do.
27298	1	H3826	Lat. 14°56′00″ S., long. 148° 44′00″ W.	711	------	wh. pter. oz-------	Do.
27299	2	H3827	Lat. 14°53′20″ S., long. 148° 42′30″ W.	486	------	crs. wh. co. s. vol. part.	Do.
27300	1	H3838	Lat. 16°57′00″ S., long. 148° 58′00″ W.	2,224	------	vol. m. glob-------	Do.
27301	1	H3840	Lat. 17°21′00″ S., long. 149° 15′00″ W.	1,585	------	vol. m----------	Do.
27302	2	H3855	Northwest point of Apataki, 1 mile SE.	654	38.8	crs. co. s----------	Do.
27303	2	H3859	Ngaruae Pass, Fakarava Atoll, S. 35°, 3.5 miles E.	666	------	pter. oz. vol. part--	Do.
27304	1	H3862	Lat. 16°51′00″ S., long. 143° 42′00″ W.	1,300	------	yl. glob. oz--------	Do.
27305	1	H3863	Lat. 16°57′00″ S., long. 145° 49′00″ W.	1,531	------	fne. vol. m. glob---	Do.
27306	4	H3873	Southwest point of Tahanae, N. 68°, 4 miles E.	966	------	glob. oz. mang----	Few.
27307	1	H3874	Southwest point of Tahanae, 2 miles E.	654	38.6	co. s. mang--------	Rare.
27308	2	H3875	Southwest point of Tahanae, about ½ mile offshore, 3 miles NE.	269	------	crs. co. s----------	Do.
27309	1	H3876	Northwest entrance to Makemo Lagoon, 1 mile SE.	467	------	wh. co. s----------	Do.
27310	2	H3878	Lat. 16°13′00″ S., long. 143° 48′00″ W.	987	------	glob. pter. vol. part.	Do.
27311	5	H3883	Northwest Pass, Raroia, 5 miles SE.	1,385	35.7	gy. yl. glob. oz. mang. part.	Few.
27312	1	H3885	Southwest point of Takume Atoll, 1.5 miles NE.	572	38.7	crs. co. s----------	Rare.
27313	1	H3887	Southwest point of Raroia Atoll, 1 mile NE.	630	38.2	co. s. mang--------	Do.
27314	3	H3899	Northwest point of Hikueru Atoll, 1.3 miles E.	798	37.8	co. s. pter. oz------	Do.
27315	1	H3900	Midway between Hikueru and Marokau.	1,372	35.7	glob. oz----------	Do.

TABLE 19.—*Reusscella spinulosa—material examined*—Continued

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°*F.*		
27316	2	D3689	Northwest point of Marokau, N. 40°, 4 miles E.	807	37.6	co. s. mang.	Rare.
27317	2	H3914	Northeast point of Nukutavake, 1 mile S.	636	38.9	co. s.	Do.
27318	1	H3916	Pinaki Atoll, 1 mile E.	486	41.0	crs. co. s. pter. oz.	Do.
27319	3	H3928	Anu Anurunga, 1 mile SE.	659	38.5	co. s. brk. sh. pter. oz.	Do.
27320	4	H3930	Anu Anuraro Atoll, ¾ mile NW.	438	40.7	co. s.	Few.
27321	1	H3931	Anu Anuraro Atoll, ½ mile SE.	405	42.5	co. s. pter. oz. mang. part.	Rare.
27322	2	H3935	Hereheretue Atoll, 1 mile W.	594	39.5	crs. co. s.	Do.
27323	1	H3945	Northeast point of Murea Island, 5 miles SW.	981	36.7	crs. vol. s. pter.	Do.
27324	3	H3961	Center of south coast of Tarawa, 10 miles N.	413	43.5	crs. br. glob. oz.	Do.
27325	1	H3965	Apaiang Atoll, in line with north point of Tarawa, 2 miles N.	170	51.3	gy. glob. oz.	Do.
27326	2	H3978	Wotju Island, Elmore Atoll, 6 miles SE.	1,068	36.5	co. s.	Do.
27327	8	H3984	Entrance to South Pass, Rongelap, 1½ miles N.	746	39.0	crs. co. s.	Common.
27328	1	H3989	South Pass, Likieb, ½ mile N.	468	42.6	crs. co. s.	Rare.
27329	10+	H3993	Schischmarev Pass, Wotje, 3 miles N.	1,187	36.1	co. s. mang.	Abundant.
27330	1	H3996	North point Arhno Atoll, S. 50°, 7 miles E.	1,325	36.0	crs. glob. oz.	Rare.

Genus TRIMOSINA Cushman, 1927

Trimosina CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 3, p. 64, 1927.

Genoholotype.—Mimosina spinulosa Millett, var.

Test triserial; chambers with a single acicular spine, or these may become obsolete; wall calcareous, vesicular; aperture elongate, removed from the edge, sometimes with an added series of rounded pores along the base of the apertural face. Recent.

TRIMOSINA ORIENTALIS Cushman

PLATE 12, FIGURES 1–5

Trimosina orientalis CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 9, p. 78, pl. 8, fig. 4, 1933.

Test elongate, tapering, 2 or 3 times as long as broad, the basal ends of the chambers much angled especially in the young stages; chambers very distinct, inflated, the early ones very angular, those of the adult becoming less so; sutures distinct, depressed; wall coarsely perforate; aperture an elongate, curved, slitlike opening becoming

broader in the last-formed chamber. Length, up to 0.55 mm.; diameter, 0.25 mm.

The types are from 7 fathoms off Rotonga.

This is apparently a species of shallow warm water and has a wide distribution as the following records of our material show: In the vicinity of the Fiji Islands, 12 and 24 fathoms off Nairai; 12 fathoms off Levuka; 3 fathoms, Viva Anchorage; and 40–50 fathoms off Fiji; as well as at Mokaujar Anchorage. Specimens also were found common at Vavau Anchorage, Tonga Islands, in 18 fathoms, and rare specimens occurred in the material from Rongelap Atoll, Marshall Islands.

TRIMOSINA PERFORATA Cushman

PLATE 12, FIGURE 6

Trimosina perforata CUSHMAN, Journ. Washington Acad. Sci., vol. 19, p. 157, figs. 1*a*, *b* (in text), 1929.

Test small, generally triangular in both side and end views, angles acute; chambers triserial throughout, rapidly increasing in size as added, the angles of the chambers usually protruding and early chambers sometimes twisted; sutures distinct, not depressed, slightly limbate; wall calcareous, finely perforate with coarser perforations along the borders near the sutures connecting with the interior by definite tubules, generally smooth, thin and nearly transparent; apertural face convex, with numerous ridges and irregular projections, aperture consisting of a long narrow opening connecting with the basal margin by a narrow slit at a sharp angle to the axis of the main opening, bordered by a distinct thickened lip, the apertural face with numerous irregularly rounded openings. Length, 0.50 mm.; breadth, 0.35 mm.

This species, which was described from 40–50 fathoms off Fiji, seems to be a very limited one in its distribution; it has not been recorded elsewhere, although it is fairly common at the type locality.

TRIMOSINA SIMPLEX Cushman

PLATE 12, FIGURE 7

Trimosina simplex CUSHMAN, Journ. Washington Acad. Sci., vol. 19, p. 158, figs. 2*a*, *b* (in text), 1929.

Test of medium size, triangular in both side and end views, angles acute; chambers triserial throughout, uniformly increasing in size as added, angles of the chambers slightly spinose, the outer angle thickened, almost carinate; sutures distinct, not depressed, very slightly limbate, rather evenly curved; wall calcareous, coarsely perforate, especially along the borders, smooth, fairly thick but translucent; apertural face slightly convex, fairly smooth, the aperture elongate without a lip, and with a few supplementary openings in the center of the terminal face. Length, up to 1.00 mm.; breadth 0.50 mm.

This species, like *perforata*, was described from rich collections taken at a depth of 40–50 fathoms off Fiji and has not been obtained in any of the other material. It is larger than *perforata*, and the outline of the chambers in the early portion is very distinct in the two species.

Genus MIMOSINA Millett, 1900

Mimosina MILLETT, Journ. Roy. Micr. Soc., 1900, p. 547.

Genotype.—By designation, *Mimosina hystrix* Millett.

Test triserial in the young, later biserial; chambers with a single acicular spine at the outer angle; wall calcareous, vesicular; aperture of two parts, one rounded and nearly terminal, the other below near the inner rim of the chamber, more elongate, arched. Recent.

MIMOSINA PACIFICA Cushman

PLATE 12, FIGURE 8

Mimosina pacifica CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 9, p. 77, pl. 8, figs. 3*a*, *b*, 1933.

Test irregularly triserial except in the adult portion, which becomes biserial, tapering from an acute initial end to the broad rounded apertural end, nearly circular in end view; chambers distinct, inflated; sutures of the early portion indistinct, later ones slightly depressed; wall calcareous, finely perforate, the initial portion with short spines which in the later portion become largely confined to the base of the chamber; aperture double in the adult, a narrow slit at the base of the inner margin of the last-formed chamber above, which is a low, elongate, supplementary opening. Length of holotype, 0.35 mm.; diameter, 0.25 mm.

The types are from off Levuka, Fiji, 12 fathoms.

This distinctive small species also occurs at Mokaujar Anchorage, Fiji, and Rongelap Atoll, Marshall Islands.

Genus CHRYSALIDINELLA Schubert, 1907

Chrysalidinella SCHUBERT, Neues Jahrb. für Min., vol. 25, p. 242, 1907.
Chrysalidina of authors (not d'Orbigny).

Genoholotype.—Chrysalidina dimorpha H. B. Brady.

Test tapering, triangular in transverse section, early chambers triserial, later ones becoming uniserial; wall calcareous, perforate; aperture in the adult cribrate, consisting of numerous rounded openings scattered over the triangular apertural face. Miocene to Recent.

This genus is directly derived from *Reussella*. The stages in development are very nicely seen in material from the station at 40–50 fathoms off Fiji, and show that it has a very close connection with *Reussella* at this station. As already noted it cannot have been derived from *Chrysalidina*, as is held by some authors, as that very large coarsely arenaceous genus belongs in the family Verneuilinidae.

CHRYSALIDINELLA DIMORPHA (H. B. Brady)

PLATE 13, FIGURE 1

Chrysalidina dimorpha H. B. BRADY, Quart. Journ. Micr. Sci., vol. 21, p. 54, 1881; Rep. Voy. *Challenger*, Zoology, vol. 9, p. 388, pl. 46, figs. 20, 21, 1884.—EGGER, Abh. kön. bay. Akad. Wiss. München, Cl. II, vol. 18, p. 274, pl. 6, figs. 47, 51, 52, 1893.—CHAPMAN, Proc. Zool. Soc. London, 1895, p. 20.—MILLETT, Journ. Roy. Micr. Soc., 1900, p. 12, pl. 1, fig. 14.—DAKIN, Rep. Ceylon Pearl-Oyster Fish., vol. 5, p. 233, 1906.—CUSHMAN, U. S. Nat. Mus. Bull. 71, pt.2, p. 60, figs. 96, 97, 1911.—HERON-ALLEN and EARLAND, Trans. Zool. Soc. London, vol. 20, p. 632, pl. 47, figs. 29–31, 1915.—CUSHMAN, U. S. Nat. Mus. Bull. 100, vol. 4, p. 144, 1921; Bull. 104, pt. 3, p. 65, pl. 19, fig. 4, 1922; Carnegie Inst. Washington Publ. 342, p. 22, 1924.—HANZAWA, Jap. Journ. Geol. Pal., vol. 4, p. 39 (table), 1925 (1926).—CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 3, pt. 1, p. 254, pl. 14, fig. 16, 1927; Cushman Lab. Foram. Res. Special Publ. No. 1, pl. 36, figs. 15, 16; pl. 37, fig. 16, 1928; Journ. Washington Acad. Sci., vol. 19, p. 159, figs. 3*a*, *b*, 1929; Cushman Lab. Foram. Res. Special Publ. No. 5, pl. 28, figs. 5*a*, *b*, 1933.—BERMUDEZ, Mem. Soc. Cubana Hist. Nat., vol. 9, p. 198, 1935.—YABE and ASANO, Science Rep. Tohoku Imp. Univ., ser. 2 (Geol.), vol. 19, No. 1, p. 122 (36), 1937.

Test elongate, tapering, triangular in transverse section, the sides nearly equal, flat, or somewhat carinate, angles acute, early portion consisting of chambers arranged triserially, the later portion with chambers in a single series; sutures distinct, slightly limbate, curved, not raised; wall smooth but distinctly and somewhat coarsely perforate; aperture in the early stages similar to that in *Reussella*, in the adult numerous, scattered more or less irregularly over the terminal face of the chamber. Length, up to 0.50 mm.; breadth, 0.25–0.35 mm.

This is a widely distributed species in the Indo-Pacific, but it has not occurred widely in our material. The best specimens are from 40–50 fathoms off Fiji.

Subfamily UVIGERININAE

Genus UVIGERINA d'Orbigny, 1826

Uvigerina D'ORBIGNY, Ann. Sci. Nat., vol. 7, p. 268, 1826.

Genotype.—By designation, *Uvigerina pigmea* d'Orbigny.

Test generally triserial, elongate, fusiform, rounded in transverse section; chambers inflated, rounded; wall calcareous, perforate; aperture terminal, rounded, with neck and lip, often with a spiral tooth and internal twisted tube. Eocene to Recent.

UVIGERINA AMPULLACEA H. B. Brady

PLATE 13, FIGURES 2–6

Uvigerina asperula CZJZEK var. *ampullacea* H. B. BRADY, Rep. Voy. *Challenger*, Zoology, vol. 9, p. 579, pl. 75, figs. 10, 11, 1884.—SIDEBOTTOM, Journ. Roy. Micr. Soc., 1918, p. 146.

Uvigerina ampullacea Egger, Abh. kön. bay. Akad. Wiss. München, Cl. II, vol. 18, p. 313, pl. 9, fig. 37, 1893.—Cushman, U. S. Nat. Mus. Bull. 71, pt. 3, p. 102, pl. 42, fig. 3, 1913; Proc. U. S. Nat. Mus., vol. 56, p. 620, 1919; U. S. Nat. Mus. Bull. 100, vol. 4, p. 274, pl. 55, fig. 7, 1921; Bull. 104, pt. 4, p. 162, pl. 42, figs. 5, 6, 1923.—Hanzawa, Jap. Journ. Geol. Pal., vol. 4, p. 42 (table), 1925 (1926).—Yabe and Hanzawa, Jap. Journ. Geol. Pal., vol. 4, p. 51,1925 (1926).—Cushman, Bull. Scripps Inst. Oceanogr., Tech. Ser., vol. 1, p. 158, 1927.—Chapman and Parr, Australasian Antarctic Exped., ser. C, vol. 1, pt. 2, p. 94, 1937.

Table 20.—*Uvigerina ampullacea—material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°*F.*		
27331	3	H3796	Haunanu Point, Ua Huku Island, Marquesas, S. 43°, 15½ miles E.	1,040	------	gn. oz. lav------	Rare.
27332	8	H3798	Cape Martin, Nukuhiva Island, N. 30° E., dist. 6½ miles.	687	39.5	drab vol. oz. glob--	Common.
27333	6	H3809	Entrance to Avatoru Pass, Rahiroa Atoll, 2.5 miles S.	645	------	fne. wh. co. s------	Few.
27334	1	H3810	Entrance to Avatoru Pass, Rahiroa Atoll, 3.5 miles S.	661	------	wh. co. s. glob. oz. min. frag.	Rare.
27335	1	H3814	Lat. 15°14′10″ S., long. 147° 51′05″ W.	391	------	wh. co. s. sh. glob.	Do.
27336	1	H3818	Lat. 15°24′10″ S., long. 147° 56′00″ W.	897	------	glob. pter. vol. part.	Do.
27337	1	H3820	Lat. 15°25′50″ S., long. 148° 24′25″ W.	1,486	------	glob. oz. vol. part.	Do.
27338	1	H3823	Lat. 15°01′00″ S., long. 148° 27′00″ W.	782	------	wh. pter. oz. vol. part.	Do.
27339	1	H3831	Lat. 15°16′00″ S., long. 148° 46′00′ W.	1,762	------	lt. gy. oz. glob-----	Do.
27340	6	H3840	Lat. 17°21′00″ S., long. 149° 15′00″ W.	1,585	------	vol. m----------	Few.
27341	6	H3841	Point Venus, Tahiti Island, S. 32°, 4.2 miles W.	775	------	crs. vol. s. mang. nods.	Do.
27342	1	H3850	Niau Atoll, S. 3°, 14 miles E---	677	------	co. s. glob. oz------	Rare.
27343	1	H3857	Center of Tikei Island, ½ mile E.	360	------	crs. co. s----------	Do.
27344	5	H3858	Ngaruae Pass, Fakarava Atoll S. 28°, 1 mile E.	599	------	-----do----------	Few.
27345	2	H3859	Ngaruae Pass, Fakarava Atoll, S. 35°, 3.5 miles E.	666	------	pter. oz. vol. part.	Rare.
27346	1	H3870	Village, point of Anaa Atoll, S. 50°, 5 miles W.	1,110	36.0	fne. co. s. pter. oz. glob.	Do.
27347	1	H3878	Lat. 16°13′00″ S., long. 143° 48′00″ W.	987	------	glob. pter. vol. part.	Do.
27348	2	H3879	Lat. 16°03′00″ S., long. 143° 32′30″ W.	1,084	36.3	gy. yl. glob. oz----	Do.
27349	1	H3883	Northwest Pass, Raroia, 5 miles SE.	1,385	35.7	gy. yl. glob. oz. mang. part.	Do.
27350	1	H3892	Northeast Pass, Makemo, 1 mile S.	603	39.0	crs. co. s----------	Do.
37351	1	H3980	South point of Leuen Island, Namu, 2 miles N.	630	39.7	-----do----------	Rare.
27352	1	H3989	South Pass, Likieb, ½ mile N.	468	42.6	-----do----------	Do.
27353	1	H3991	Lat. 9°40′00″ N., long. 169° 32′00″ E.	1,583	35.5	glob. oz----------	Do.

Test elongate, somewhat fusiform, or the basal portion somewhat inflated and later chambers becoming nearly uniserial; chambers inflated, later ones particularly rather distinct, early ones sometimes obscured by the ornamentation of the surface; sutures slightly depressed, fairly distinct; wall ornamented by numerous, fine, short, rather evenly distributed spines, covering the entire surface, often even on the neck itself; aperture elongate, cylindrical, in well-preserved specimens with an everted lip, apertural opening being rounded. Length, up to 1 mm.; breadth, 0.20–0.35 mm.

This has proved to be a rather common species in our Tropical Pacific material, but it is a species of comparatively deep water and has not occurred at the shallower water stations about the various slands. Its distribution with data is given in table 20.

UVIGERINA PORRECTA H. B. Brady

PLATE 13, FIGURES 7, 8

Uvigerina porrecta H. B. BRADY, Quart. Journ. Micr. Sci., vol. 19, p. 60, pl. 8, figs. 15, 16, 1879; Rep. Voy. *Challenger*, Zoology, vol. 9, p. 577, pl. 74, figs. 21–23, 1884; Quart. Journ. Geol. Soc., vol. 44, p. 9 (table), 1888.—EGGER, Abh. kön. bay. Akad. Wiss. München, Cl. II, vol. 18, p. 315, pl. 9, figs. 57, 63, 1893.—CHAPMAN, Journ. Linn. Soc. Zool., vol. 28, p. 403, 1902.—MILLETT, Journ. Roy. Micr. Soc., 1903, p. 269.—CHAPMAN, Journ. Linn. Soc. Zool., vol. 30, p. 414, 1910.—CUSHMAN, U. S. Nat. Mus. Bull. 71, pt. 3, p. 99, pl. 44, fig. 2, 1913.—HERON-ALLEN and EARLAND, Trans. Zool. Soc. London, vol. 20, p. 675, 1915.—SIDEBOTTOM, Journ. Roy. Micr. Soc., 1918, p. 147.—CUSHMAND, U. S. Nat. Mus. Bull. 104, pt. 4, p. 169, 1923.—HERON-ALLEN and EARLAND, Journ. Linn. Soc. Zool., vol. 35, p. 626, 1924.—CUSHMAN, Carnegie Inst. Washington Publ. 342, p. 27, pl. 7, figs. 6, 7, 1924; Cushman Lab. Foram. Res. Special Publ. No. 5, pl. 28, fig. 10, 1933.—CHAPMAN and PARR, Australasian Antarctic Exped., ser. C., vol. 1, pt. 2, p. 95, 1937.

Test much elongated, the early chambers in a close spiral, later ones drawn out and considerably separated from one another, in an irregular loose spiral, the later chambers particularly being somewhat concave below, the peripheral angle angular and projecting, upper surface convex and ornamented by coarse longitudinal costae which project slightly at the periphery making it serrate; sutures distinct, depressed; wall calcareous, usually opaque, ornamented as already noted; aperture with an elongate tubular neck, but the lip usually only slightly developed. Length, up to 0.65 mm.; breadth, 0.20 mm.

The records for this species are almost entirely from the Pacific. The other records referred to this are probably not the same. Our specimens are mostly from off Levuka, Fiji, in 12 fathoms, where it is common. It also occurs in shallow water near Nairai, Fiji, but the few other records are from *Albatross* stations, data for which are given in table 21. These, strangely enough, are all from the western part of the area in which the *Albatross* dredged. The following variety is very distinct.

TABLE 21.—*Uvigerina porrecta—material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°*F.*		
27354	1	H3983	Entrance to South Pass, Rongelap, ½ mile N.	400	43.4	co. s.	Rare.
27355	1	H3984	Entrance to South Pass, Rongelap, 1½ miles N.	746	39.0	crs. co. s.	Do.
27356	1	H3992	Schischmarev Pass, Wotje, 1 mile N.	482	41.7	co. s.	Do.
27357	1	H3993	Schischmarev Pass, Wotje, 3 miles N.	1,187	36.1	co. s. mang.	Do.
27358	1	H3997	Southwest point of Arhno Atoll, 6 miles NE.	1,253	36.0	glob. oz.	Do.

UVIGERINA PORRECTA H. B. Brady var. FIMBRIATA Sidebottom

PLATE 13, FIGURES 9, 10

Uvigerina porrecta H. B. BRADY var. *fimbriata* SIDEBOTTOM, Journ. Roy. Micr. Soc., 1918, p. 147, pl. 5, fig. 23.—BERMUDEZ, Mem. Soc. Cubana Hist. Nat., vol. 9, p. 198, 1935.

Variety differing from the typical in the very elongate test, in the much greater separation of the chambers into a loose spiral, and in the high development of the peripheral keel, the lower side of the chambers becoming distinctly concave.

This variety is common at the station from 40–50 fathoms off Fiji but was not met with elsewhere. Sidebottom's types were from off the east coast of Australia in 465 fathoms. Bermudez has recorded it from off the north coast of Cuba.

UVIGERINA PROBOSCIDEA Schwager

PLATE 14, FIGURES 1–4

Uvigerina proboscidea SCHWAGER, *Novara* Exped., Geol. Theil, vol. 2, p. 250, pl. 7, fig. 96, 1866.—KARRER, *in* von Drasche, Frag. Geol. Insel Luzon, p. 94, 1878.—CUSHMAN, U. S. Nat. Mus. Bull. 71, pt. 3, p. 94, pl. 42, fig. 2, 1913.—HANZAWA, Jap. Journ. Geol. Pal., vol. 4, p. 42 (table), 1925 (1926).—GALLOWAY and MORREY, Bull. Amer. Pal., vol. 15, p. 39, pl. 6, fig. 4, 1929.—CUSHMAN, STEWART, and STEWART, Trans. San Diego Soc. Nat. Hist., vol. 6, p. 69, pl. 5, fig. 10, 1930.—CUSHMAN, B. P. Bishop Mus. Bull. 119, p. 126, pl. 15, fig. 10, 1934.—YABE and ASANO, Science Rep. Tohoku Imp. Univ., ser. 2 (Geol.), vol. 19, No. 1, p. 123 (37), 1937.—CUSHMAN, Journ. Geol. Soc. Japan, vol. 46, No. 546, p. 151 (41), pl. 10 (6), fig. 13, 1939.

Test stout, fusiform, the later chambers tending slightly to become irregularly uniserial; chambers inflated; sutures distinct, depressed; wall ornamented with numerous, fine, short spines rather evenly scattered over the entire surface of the test; aperture elongate, tubular, usually with a slight neck. Length, up to 1 mm.; breadth, 0.30–0.45 mm.

This species described by Schwager from the Pliocene of Kar Nicobar is a fairly common one in various parts of the Pacific. In our present material it is not nearly so abundant as is the preceding species. It may be distinguished from *U. ampullacea* by the stouter form of the test, which does not have the chambers so definitely concentrated at the base, in the adult stage tending rather to become biserial than uniserial. In our material it is represented particularly by the following variety.

TABLE 22.—*Uvigerina proboscidea*—*material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°F.		
27359	6	H3798	Cape Martin, Nukuhiva Island, N. 30° E., dist. 6½ miles.	687	39.5	drab vol. oz. glob.	Few.
27360	1	H3808	Entrance to Avatoru Pass, Rahiroa Atoll, 1.5 miles S.	604	------	brk. sh----------	Rare.
27361	1	H3819	Lat. 15°25′00″ S., long. 148° 08′00″ W.	1,123	------	wh. co. s. glob. vol. part.	Do.
27362	1	H3824	Lat. 15°00′20″ S., long. 148° 30′00″ W.	850	------	wh. pter. glob. oz--	Do.
27363	5	H3841	Point Venus, Tahiti Island, S. 32°, 4.2 miles W.	775	------	ers. vol. s. mang. nod.	Few.
27364	1	H3851	Apataki, south end, 9 miles N.	675	------	pter. oz----------	Rare.
27365	2	H3859	Ngaruae Pass, Fakarava Atoll, S. 35°, 3.5 miles E.	666	------	pter. oz. vol. part--	Do.
27366	2	H3862	Lat. 16°51′00″ S., long. 143° 42′00″ W.	1,300	------	yl. glob. oz--------	Do.
27367	1	H3873	Southwest point of Tahanae, N. 68°, 4 miles E.	966	------	glob. oz. mang----	Do.
27368	2	D3689	Northwest point of Marokau, N. 40°, 4 miles E.	807	37.6	co.s. mang--------	Do.
27369	1	H3924	Nukutipipi Atoll, 1 mile NW--	649	39.0	co. s. brk. sh------	Do.
27370	1	H3926	Midway between Nukutipipi and Anu Anurunga.	1,609	35.5	co. s. mang. glob--	Do.
27371	1	H3928	Anu Anurunga, 1 mile SE-----	659	38.5	co. s. brk. sh. pter. oz.	Do.
27372	1	H3937	Hereheretue Atoll, 5.3 miles SE.	1,688	35.3	lt. br. glob. oz. mang. part.	Do.
27373	1	H3969	Lat. 2°49′00″ N., long. 173° 01′00″ E.	1,461	35.3	glob. oz----------	Do.
27374	1	H3974	South point of Jaluit Atoll, N. 14°, 5 miles E.	1,937	35.0	ers. gy. glob. oz----	Do.
27375	1	H3978	Wotju Island, Elmore Atoll, 6 miles SE.	1,068	36.5	co. s----------	Do.

UVIGERINA PROBOSCIDEA Schwager var. VADESCENS Cushman

PLATE 14, FIGURES 5–9

Uvigerina proboscidea SCHWAGER var. *vadescens* CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 9, p. 85, pl. 8, figs. 14, 15, 1933.

Variety differing from the typical in the slenderer form, smaller size, and the base, which is usually ornamented with a very distinct

acicular spine, the apertural end tapering with a very distinct, sometimes rather elongate, cylindrical neck and slight lip.

The types are from 21 fathoms, Guam Anchorage, Ladrone Islands.

Besides the type locality, this variety occurs off Nairai, Fiji, and at 12 fathoms off Levuka, Fiji. There are numerous *Albatross* stations in deeper water, the data for which are given in table 23.

TABLE 23.—*Uvigerina proboscidea* var. *vadescens*—*material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°*F.*		
27376	1	H3794	Lat. 8°31′00″ S., long. 139° 26′00″ W.	1,939	------	gy. yl. oz. crs. glob.	Rare.
27377	5	H3798	Cape Martin, Nukuhiva Island, N. 30° E., dist. 6½ miles.	687	39.5	drab vol. oz. glob.	Few.
27378	1	H3820	Lat. 15°25′50″ S., long. 148° 24′25″ W.	1,486	------	glob. oz. vol. part.	Rare.
27379	3	H3838	Lat. 16°57′00″ S., long. 148° 58′00″ W.	2,224	------	vol. m. glob.	Do.
27380	10+	H3840	Lat. 17°21′00″ S., long. 149° 15′00″ W.	1,585	------	vol. m.	Abundant.
27381	2	H3841	Point Venus, Tahiti Island, S. 32°, 4.2 miles W.	775	------	crs. vol. s. mang. nod.	Rare.
27382	1	H3974	South point of Jaluit Atoll, N. 14°, 5 miles E.	1,937	35.0	crs. gy. glob. oz.	Do.
27383	1	H3996	North point of Arhno Atoll, S. 50°, 7 miles E.	1,325	36.0	crs. glob. oz.	Do.

Genus HOPKINSINA Howe and Wallace, 1933

Hopkinsina HOWE and WALLACE, Louisiana Geol. Surv. Bull. 2, p. 182, 1933.

Genoholotype.—Hopkinsina danvillensis Howe and Wallace.

Test in the early stages similar to *Uvigerina*, in the adult becoming biserial but somewhat twisted; wall calcareous, perforate; aperture terminal, oval or circular, usually with a short neck and lip. Eocene to Recent.

HOPKINSINA PACIFICA Cushman

PLATE 15, FIGURE 1

Hopkinsina pacifica CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 9, p. 86, pl. 8, fig. 16, 1933.

Test small, fusiform, early portion with the chambers irregularly triserial, later generally biserial, somewhat compressed; chambers distinct, inflated, in the adult with two pairs of biserial chambers; sutures distinct, depressed; wall smooth, finely perforate; aperture with a short neck and slightly thickened lip. Length, 0.20 mm.; breadth, 0.10 mm.; thickness, 0.07 mm.

The types are from Vavau Anchorage, Tonga Islands. It is a small species and probably has been overlooked but is distinctly biserial like other members of this genus.

Genus SIPHOGENERINA Schlumberger, 1883

Siphogenerina Schlumberger, Feuille Jeun. Nat., ann. 13, p. 117, 1883.
Sagrina (part) of authors (not d'Orbigny).

Genotype.—By designation, *Siphogenerina costata* Schlumberger.

Test elongate, cylindrical, with the early stages typically triserial, rounded in section, later uniserial; wall calcareous, perforate; aperture in the adult terminal, with a distinct neck, phialine lip and internal tube. Eocene to Recent.

This genus is well developed in the Pacific and shows three of the principal developments of ornamentation in the group, longitudinally costate, finely spinose, and strongly pitted. Some of the specimens are very similar to *Rectobolivina* and perhaps should be placed in that genus, which is one closely allied to *Siphogenerina* but derived evidently from *Bolivina*. There is a great difference in the microspheric and megalospheric forms in the shape of the test, which in the microspheric has a sharply tapering base, while the megalospheric form is broadly rounded at the base.

SIPHOGENERINA VIRGULA (H. B. Brady)

Plate 15, Figures 2, 3

Sagrina virgula H. B. Brady, Quart. Journ. Micr. Sci., vol. 19, p. 275, pl. 8, figs. 19–21, 1879; Rep. Voy. *Challenger*, Zoology, vol. 9, p. 583, pl. 76, figs. 4–7 (not 8–10), 1884.—Millett, Journ. Roy. Micr. Soc., 1903, p. 271.—Heron-Allen and Earland, Trans. Zool. Soc. London, vol. 20, p. 676, pl. 51, figs. 4, 5, 1915.—Sidebottom, Journ. Roy. Micr. Soc., 1918, p. 148.—Heron-Allen and Earland, British Antarctic (*Terra Nova*) Exped., Zoology, vol. 6, p. 186, 1922.

Siphogenerina (*Sagrina*) *virgula* Egger, Abh. kön. bay. Akad. Wiss. München, Cl. II, vol. 18, p. 318, pl. 9, fig. 27, 1893.

Siphogenerina virgula Cushman, Carnegie Inst. Washington Publ. 342, p. 29, pl. 8, figs. 3, 4, 1924; Proc. U. S. Nat. Mus., vol. 67, art. 25, p. 14, pl. 2, figs. 7, 8; pl. 4, figs. 8, 9, 1926.

Test elongate, somewhat tapering, composed of a number of inflated chambers, the early ones in a uvigerine arrangement, later ones uniserial, the uniserial portion making up most of the test, surface hispid; aperture large, terminal, with a broad everted lip, the border of which often has a series of backwardly pointing, long, acicular spines. Length, up to 1.75 mm.; diameter, 0.30 mm.

There is a tendency in many of the specimens to reduce greatly the early stages so that in the megalospheric form nearly the entire test is uniserial. This typically Indo-Pacific species has occurred at a number of stations in our Pacific material, but all from the shoal-

water material where it is often very abundant. It is abundant at some of the stations off Fiji, in 12 fathoms off Nairai; 12 fathoms off Levuka; Mokaujar Anchorage, Fiji; and Viva Anchorage, Fiji. It occurs less commonly at Vavau Anchorage, Tonga Islands, 18 fathoms; Rotonga, 7 fathoms; and Port Lotten, Kersail, Caroline Islands.

SIPHOGENERINA DIMORPHA (Parker and Jones) var. PACIFICA Cushman

PLATE 15, FIGURE 4

Uvigerina (*Sagrina*) *dimorpha* PARKER and JONES (part), Philos. Trans. Roy. Soc., vol. 155, p. 420, 1865.

Sagrina dimorpha H. B. BRADY (part), Rep. Voy. *Challenger*, Zoology, vol. 9, p. 582, pl. 76, figs. 1–3, 1884.—BAGG, Proc. U. S. Nat. Mus., vol. 34, p. 152, 1908.—SCHUBERT, Abh. geol. Reichs., vol. 20, pt. 4, p. 86, 1911.—SIDEBOTTOM, Journ. Roy. Micr. Soc., 1918, p. 148.—HERON-ALLEN and EARLAND, British Antarctic (*Terra Nova*) Exped., Zoology, vol. 6, p. 186, 1922.

Siphogenerina dimorpha EGGER, Abh. kön. bay. Akad. Wiss. München, Cl. II, vol. 18, p. 317, pl. 9, fig. 30, 1893.—CUSHMAN, U. S. Nat. Mus. Bull. 71, pt. 3, p. 106, pl. 45, figs. 3, 4, 1913; Bull. 100, vol. 4, p. 279, pl. 56, fig. 8, 1921.

Siphogenerina dimorpha (PARKER and JONES) var. *pacifica* CUSHMAN, Proc. U. S. Nat. Mus., vol. 67, art. 25, p. 13, pl. 2, fig. 9; pl. 3, figs. 6*a*, *b*, 1926; B. P. Bishop Mus. Bull. 119, p. 126, 1934.

TABLE 24.—*Siphogenerina dimorpha* var. *pacifica*—*material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°*F.*		
27384	1	H3804	Entrance to Ahii Lagoon, 2.5 miles SE.	1,208	------	lt. gy. oz. glob----	Rare.
27385	1	H3809	Entrance to Avatoru Pass, Rahiroa Atoll, 2.5 miles S.	645	------	fne. wh. co. s------	Do.
27386	1	H3812	Entrance to Avatoru Pass, Rahiroa Atoll, 7.5 miles S.	819	------	wh. co. s. glob. oz. vol. part.	Do.
27387	1	H3829	Lat. 14°56′00″ S., long. 148° 48′00″ W.	860	------	wh. co. s. glob. vol. part.	Do.
27388	4	H3840	Lat. 17°21′00″ S., long. 149° 15′00″ W.	1,585	------	vol. m----------	Few.
27389	8	H3841	Point Venus, Tahiti Island, S. 32°, 4.2 miles W.	775	------	ers. vol. s. mang. nod.	Common.
27390	2	H3843	Point Venus, Tahiti Island, S. 55°, 3.8 miles E.	807	------	fne. vol. s. m------	Rare.
27391	1	H3851	Apataki, south end, 9 miles N.	675	------	pter. oz----------	Do.
27392	1	H3859	Ngaruae Pass, Fakarava Atoll, S. 35°, 3.5 miles E.	666	------	pter. oz. vol. part.	Do.
27393	3	H3873	Southwest point of Tahanae, N. 68°, 4 miles E.	966	------	glob. oz. mang.	Do.
27394	4	H3945	Northeast point of Murea Island, 5 miles SW.	981	36.7	ers. vol. s. pter----	Few.
27395	4	H3954	West end of Nomuka Island, N. 33°, 6 miles E.	600	39.2	co. s. pum. pter. oz.	Do.
27396	1	H3974	South point of Jaluit Atoll, N. 14°, 5 miles E.	1,937	35.0	ers. gy. glob. oz----	Rare.
27397	1	H3984	Entrance to South Pass, Rongelap, 1½ miles N.	746	39.0	ers. co. s----------	Do.

Variety differing from the typical in the greater number of uniserial chambers, the cylindrical form of the test, and the much more prominent depressions at the base of the chambers along the sutures.

This variety is widely distributed in the Pacific in Recent samples, and it is also recorded by Schubert from the *Globigerina* marl of late Tertiary age from Panaras in the Bismarck Archipelago, and by Koch from the late Tertiary of Kabu, Java. Most of the records are from offshore stations, and the same holds true in the *Albatross* material under discussion. The species has not occurred at any of the shoal-water stations, all of them being from the *Albatross* dredgings, data for which are given in table 24.

SIPHOGENERINA COLUMELLARIS (H. B. Brady)

PLATE 15, FIGURE 5

Sagrina columellaris H. B. BRADY, Quart. Journ. Micr. Sci., vol. 21, p. 64, 1881; Rep. Voy. *Challenger*, Zoology, vol. 9, p. 581, pl. 75, figs. 15–17, 1884.—CHAPMAN, Proc. Zool. Soc. London, 1895, p. 36.—FORNASINI, Rend. Accad. Sci. Bologna, vol. 1, p. 55, fig., 1896–97; Mem. Accad. Sci. Ist. Bologna, ser. 5, vol. 8, p. 391, fig. 41, 1900.—CHAPMAN, Journ. Linn. Soc. Zool., vol. 28, p. 404, 1902.—MILLETT, Journ. Roy. Micr. Soc., 1903, p. 270, pl. 5, figs. 10, 11.—BAGG, Proc. U. S. Nat. Mus., vol. 34, p. 151, 1908.—HERON-ALLEN and EARLAND, Trans. Zool. Soc. London, vol. 20, p. 676, 1915.—SIDEBOTTOM, Journ. Roy. Micr. Soc., 1918, p. 148, pl. 5, fig. 24.—HERON-ALLEN and EARLAND, British Antarctic (*Terra Nova*) Exped., Zoology, vol. 6, p. 185, 1922; Journ. Linn. Soc. Zool., vol. 35, p. 626, 1924.

Siphogenerina (*Sagrina*) *columellaris* EGGER, Abh. kön. bay. Akad. Wiss. München, Cl. II, vol. 18, p. 316, pl. 9, figs. 28, 31, 33, 1893.

Siphogenerina columellaris SILVESTRI, Atti Accad. Pont. Nuovi Lincei, ann. 55, p. 1, figs. 1, 2, 1902.—CUSHMAN, U. S. Nat. Mus. Bull. 71, pt. 3, p. 104, pl. 47, figs. 2, 3, 1913; Bull. 100, vol. 4, p. 276, pl. 56, fig. 1, 1921; Carnegie Inst. Washington Publ. 342, p. 29, pl. 8, figs. 5, 6, 1924; Proc. U. S. Nat. Mus., vol. 67, art. 25, p. 11, pl. 2, figs. 4, 11; pl. 3, figs. 1–4; pl. 4, figs. 5, 6; pl. 5, figs. 9–11, 1926.

Siphogenerina glabra SCHLUMBERGER, Feuille Jeun. Nat., ann. 13, p. 118, pl. 3, fig. 1, 1883.—CHAPMAN and PARR, Australasian Antarctic Exped., ser. C, vol. 1, pt. 2, p. 96, 1937.—OVEY, Journ. Roy. Micr. Soc., vol. 47, p. 119, 1937.

Test elongate, subcylindrical, somewhat tapering, straight or very slightly curved; chambers comparatively few, those of the uniserial portion well rounded, shorter than broad; sutures only slightly constricted; aperture large, terminal, with a very short tubular neck and broad flaring lip; wall smooth. Length, up to 2.25 mm.; diameter, 0.50 mm.

This is the least common of the species of the genus in our material. It has occurred in only one of the shoal-water stations, in 24 fathoms off Nairai, Fiji, and rarely at three of the *Albatross* stations, data for which are given in table 25. The figured specimen is a megalospheric one in which the proloculum is very large, but the general characters of the test are typical.

TABLE 25.—*Siphogenerina columellaris*—*material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°*F.*		
27398	1	H3840	Lat. 17°21′00″ S., long. 149° 15′00″ W.	1,585	------	vol. m----------	Rare.
27399	1	H3859	Ngaruae Pass, Fakarava Atoll, S. 35°, 3.5 miles E.	666	------	pter. oz. vol. part--	Do.
27400	1	H3875	Southwest point of Tahanae, about ½ mile offshore, 3 miles NE.	269	------	ers. co. s----------	Do.

SIPHOGENERINA RAPHANA (Parker and Jones)

PLATE 15, FIGURES 6-9

Uvigerina (*Sagrina*) *raphanus* PARKER and JONES, Philos. Trans. Roy. Soc., vol. 155, p. 364, pl. 18, figs. 16, 17, 1865.

Sagrina raphanus H. B. BRADY, Rep. Voy. *Challenger*, Zoology, vol. 9, p. 585, pl. 75, figs. 21–24, 1884.—WOODWARD, The Observer, 1893, p. 144.—CHAPMAN, Journ. Linn. Soc., Zool., vol. 28, pp. 187, 208, 1900; p. 403, 1902.—MILLETT, Journ. Roy. Micr. Soc., 1903, p. 272.—DAKIN, Rep. Ceylon Pearl Oyster Fish., vol. 5, p. 236, pl., fig. 11, 1906.—CHAPMAN, Journ. Linn. Soc. Zoology, vol. 30, p. 415, 1910.—SCHUBERT, Abh. geol. Reichs., vol. 20, pt. 4, p. 88, 1911.—HERON-ALLEN and EARLAND, Trans. Zool. Soc. London, vol. 20, p. 677, 1915.—SIDEBOTTOM, Journ. Roy. Micr. Soc., 1918, p. 148.—HERON-ALLEN and EARLAND, British Antarctic (*Terra Nova*) Exped., Zoology, vol. 6, p. 186, 1922; Journ. Linn. Soc. Zool., vol. 35, p. 627, 1924.

Siphogenerina (*Sagrina*) *raphanus* EGGER, Abh. kön. bay. Akad. Wiss. München, Cl. II, vol. 18, p. 317, pl. 9, fig. 36, 1893.

Siphogenerina raphanus CUSHMAN, U. S. Nat. Mus. Bull. 71, pt. 3, p. 108, pl. 46, figs. 1–5, 1913; Bull. 100, vol. 4, p. 280, pl. 56, fig. 7, 1921; Carnegie Inst. Washington Publ. 311, p. 35, pl. 5, fig. 5, 1922; U. S. Nat. Mus. Bull. 104, pt. 4, p. 174, pl. 42, fig. 14, 1923.—YABE and HANZAWA, Jap. Journ. Geol. Pal., vol. 2, No. 2, p. 32, 1923; vol. 2, No. 4, p. 103, 1923.—CUSHMAN, Carnegie Inst. Washington Publ. 342, p. 28, pl. 8, figs. 1, 2, 1924.—YABE and HANZAWA, Jap. Journ. Geol. Pal., vol. 4, p. 51, 1925 (1926).—CUSHMAN, Proc. U. S. Nat. Mus., vol. 67, art. 25, p. 4, pl. 1, figs. 1–4; pl. 2, figs. 1–3, 10; pl. 5, figs. 1, 2, 1926; Carnegie Inst. Washington Publ. 344, p. 77, 1926; Contr. Cushman Lab. Foram. Res., vol. 3, pt. 4, p. 190, 1927.—HADA, Trans. Sapporo Nat. Hist. Soc., vol. 11, pt. 1, p. 13, 1929; Science Rep. Tohoku Imp. Univ., ser. 4, Biol., vol. 6, p. 134, text fig. 91, 1931.—CUSHMAN and PARKER, Proc. U. S. Nat. Mus., vol. 80, art. 3, p. 17, pl. 3, figs. 25, 26, 1931.—PARR, Proc. Roy. Soc. Victoria, vol. 44, p. 225, pl. 21, fig. 24, 1932.—CUSHMAN, Cushman Lab. Foram. Res. Special Publ. No. 5, pl. 28, figs. 18, 19, 1933.—BERMUDEZ, Mem. Soc. Cubana Hist. Nat., vol. 9, p. 199, 1935.—ASANO, Journ. Geol. Soc. Japan, vol. 43, No. 519, pl. 52 (18), figs. 6*a*, *b*, 1936.—YABE and ASANO, Science Rep. Tohoku Imp. Univ., ser. 2 (Geol.), vol. 19, No. 1, p. 123 (37), 1937.

Siphogenerina raphanus (PARKER and JONES) var. *costulata* CUSHMAN, Proc. U. S. Nat. Mus., vol. 51, p. 662, 1917; U. S. Nat. Mus. Bull. 100, vol. 4, p. 281, pl. 56, fig. 6, 1921.

Siphogenerina costata SCHLUMBERGER, Feuille Jeun. Nat., ann. 13, p. 118, fig. 13, 1883.

Test elongate, cylindrical or tapering, chambers of the uniserial portion broader than long, surface marked by several rather widely separated, well-developed costae, each extending nearly the length of the test, independent of the sutures; aperture typically with a short tubular neck and well-developed flaring lip. Length, up to nearly 2 mm.; breadth, up to 0.55 mm.

This is the commonest species of the genus in the area. It is more abundant in the shallow-water material from about the various islands, although there are numerous records for it from the *Albatross* dredg-

TABLE 26.—*Siphogenerina raphana—material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°F.		
27401	1	H3804	Entrance to Ahii Lagoon, 2.5 miles SE.	1,208	------	lt. gy. oz. glob----	Rare.
27402	5	H3840	Lat. 17°21′00″ S., long. 149°15′00″ W.	1,585	------	vol. m----------	Few.
27403	1	H3841	Point Venus, Tahiti Island, S. 32°, 4.2 miles W.	775	------	crs. vol. s. mang. nod.	Rare.
27404	3	H3843	Point Venus, Tahiti Island, S. 55°, 3.8 miles E.	807	------	fne. vol. s. m------	Do.
27405	1	H3853	Pakaka entrance, Apataki Lagoon, N. 50°, 2 miles E.	613	39.4	co. vol----------	Do.
27406	1	H3855	Northwest point of Apataki, 1 mile SE.	654	38.8	crs. co. s----------	Do.
27407	1	H3858	Ngaruae Pass, Fakarava Atoll, S. 28°, 1 mile E.	599	------	-----do----------	Do.
27408	1	H3873	Southwest point of Tahanae, N. 68°, 4 miles E.	966	------	glob. oz. mang----	Do.
27409	1	H3876	Northwest entrance to Makemo Lagoon, 1 mile SE.	467	------	wh. co. s----------	Do.
27410	1	H3883	Northwest Pass, Raroia, 5 miles SE.	1,385	35.7	gy. yl. glob. oz. mang. part.	Do.
27411	1	H3896	Tekokoto Atoll, 1 mile E----	617	38.4	co. s----------	Do.
27412	1	H3899	Northwest point of Hikueru Atoll, 1.3 miles E.	798	37.8	co. s. pter. oz------	Do.
27413	1	H3900	Midway between Hikueru and Marokau.	1,372	35.7	glob. oz----------	Do.
27414	1	H3916	Pinaki Atoll, 1 mile E-------	486	41.0	crs. co. s. pter. oz--	Do.
27415	1	H3935	Hereheretue Atoll, 1 mile W--	594	39.5	crs. co. s----------	Do.
27416	2	H3945	Northeast point Murea Island, 5 miles SW.	981	36.7	crs. vol. s. pter----	Do.
27417	4	H3983	Entrance to South Pass, Rongelap, ½ mile N.	400	43.4	co. s----------	Few.
27418	3	H3984	Entrance to South Pass, Rongelap, 1½ miles N.	746	39.0	crs. co. s----------	Rare.
27419	2	H3989	South Pass, Likieb, ½ mile N.	468	42.6	-----do----------	Do.
27420	6	H3992	Schischmarev Pass, Wotje, 1 mile N.	482	41.7	co. s----------	Few.
27421	10+	H3993	Schischmarev Pass, Wotje, 3 miles N.	1,187	36.1	co. s. mang-------	Abundant.

ings as will be seen by the data given in table 26. From shallow water we have specimens from 40–50 fathoms off Fiji; off Levuka, Fiji, 12 fathoms; off Nairai, Fiji, 12 and 24 fathoms; Mokaujar Anchorage, Fiji; Makemo Lagoon, Paumotu Islands; Pinaki, Paumotu Islands; off Rangiroa; off Rutavu; Vavau Anchorage, Tonga Islands, 18 fathoms; Guam Anchorage, Ladrone Islands, 21 fathoms; Rongelap Atoll, Marshall Islands; and Port Lotten, Kersail, Caroline Islands.

Genus ANGULOGERINA Cushman, 1927

Angulogerina CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 3, p. 69, 1927.
Uvigerina (part) of authors.

Genoholotype.—Uvigerina angulosa Williamson.

Test triserial, elongate, the whole test angled, with three flattened sides and distinct angles; wall calcareous, perforate; aperture at the end of a short neck, with a phialine lip. Eocene to Recent.

Instead of the distribution of this genus being in temperate shallow waters, as has been recorded by some authors, there are a number of characteristic species found in shallow tropical waters of the Atlantic, but in the Pacific it occurs at very considerable depths, where it is often abundant, as off the California coast. Specimens are rare in the Pacific material that we have, and only two species are represented.

ANGULOGERINA ALBATROSSI Cushman var. ORNATA Cushman

PLATE 15, FIGURES 10, 11

Angulogerina albatrossi CUSHMAN var. *ornata* CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 8, p. 45, pl. 6, figs. 13, 14, 1932.

This variety is already known from fairly deep water in the eastern Pacific. The last chamber is usually smooth, but the early ones show longitudinal costae and the chambers are decidedly angular. Our specimens are all from the *Albatross* dredgings, data for which are given in table 27.

TABLE 27.—*Angulogerina albatrossi* var. *ornata—material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°*F.*		
24914	2	H3798	Cape Martin, Nukuhiva Island, N. 30° E., dist. 6½ miles.	687	39.5	drab vol. oz. glob..	Rare.
24915	1	H3967	Monument, west shore of Maraki Atoll, S. 50°, ½ mile E.	431	------	----------	Do.
24916	1	H3989	South Pass, Likieb, ½ mile N.	468	42.6	crs. co. s----------	Do.
24917	1						
24918	1	H3996	North point of Arhno Atoll, S. 50°, 7 miles E.	1,325	36.0	crs. glob. oz------	Do.

ANGULOGERINA OCCIDENTALIS (Cushman)

PLATE 15, FIGURE 12

Uvigerina angulosa CUSHMAN (not Williamson), Carnegie Inst. Washington Publ. 311, p. 34, pl. 5, figs. 3, 4, 1922.

Uvigerina occidentalis CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 4, p. 169, 1923.

Angulogerina occidentalis CUSHMAN, Florida State Geol. Surv. Bull. 4, p. 50, pl. 9, figs. 8, 9, 1930.—CUSHMAN and PARKER, Proc. U. S. Nat. Mus., vol. 80, art. 3, p. 17, 1931.—COLE, Florida State Geol. Surv. Bull. 6, p. 44, pl. 2, fig. 5, 1931.—CUSHMAN and LAIMING, Journ. Pal., vol. 5, p. 112, pl. 12, figs. 15, 16, 1931.—CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 8, p. 46, pl. 6, figs. 15, 16, 1932.—CUSHMAN and PONTON, Florida State Geol. Surv. Bull. 9, p. 14, pl. 1, fig. 30, 1932.—CUSHMAN and CAHILL, U. S. Geol. Surv. Prof. Paper 175A, p. 28, pl. 9, figs. 8*a*, *b*, 1933.—CAMPBELL, Journ. Ent. Zool., vol. 27, No. 3, p. 46, fig. 10, 1935.—HADLEY, Journ. Elisha Mitchell Sci. Soc., vol. 52, No. 1, p. 35, 1936.—KLEINPELL, Mioc. Stratigraphy Calif., p. 306, 1939.

Test minute, elongate, triangular in transverse section, the periphery somewhat lobulate; chambers distinct, those of the last-formed portion becoming more distinct and remote; sutures distinct and depressed; wall ornamented with longitudinal costae on all but the last-formed chambers in the adult; apertural end drawn out into a short tubular neck and slight phialine lip. Length, 0.30 mm.; diameter, 0.12 mm.

The figured specimen does not show the uniserial stage very highly developed. This species, originally described from the Atlantic in the West Indian region, is found rarely also in the Pacific about the oceanic islands. We have records for three *Albatross* stations, given in table 28. The species is also known from the Miocene onward, both in Florida and California.

TABLE 28.—*Angulogerina occidentalis—material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°*F.*		
24919	1	H3838	Lat. 16°57′00″ S., long. 148°58′00″ W.	2,224	------	vol. m. glob------	Rare.
24920	2	H3840	Lat. 17°21′00″ S., long. 149°15′00″ W.	1,585	------	vol. m----------	Do.
24921	2	H3841	Point Venus, Tahiti Island, S. 32°, 4.2 miles W.	775	------	crs. vol. s. mang. nod.	Do.

Genus TRIFARINA Cushman, 1923

Trifarina CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 4, p. 99, 1923.

Genoholotype.—Trifarina bradyi Cushman.

Test elongate, triangular in transverse section; early chambers in an irregular spire or triserial, later uniserial; wall calcareous, perforate; aperture terminal in adult, rounded, with short neck and lip. Eocene to Recent.

TRIFARINA BRADYI Cushman

PLATE 15, FIGURE 13

Rhabdogonium tricarinatum H. B. BRADY (not *Vaginulina tricarinata* d'Orbigny), Rep. Voy. *Challenger*, Zoology, vol. 9, p. 525, pl. 67, figs. 1–3, 1884; Journ. Roy. Micr. Soc., 1887, p. 910.—H. B. BRADY, PARKER, and JONES, Trans. Zool. Soc. London, vol. 12, p. 223, pl. 45, fig. 3, 1888.—WRIGHT, Ann. Mag. Nat. Hist., ser. 6, vol. 4, p. 449, 1889; Proc. Roy. Irish Acad., ser. 3, vol. 1, p. 484, 1891.—EGGER, Abh. kön. bay. Akad. Wiss. München, Cl. II, vol. 18, p. 355, pl. 11, figs. 49, 50; pl. 12, figs. 36–38, 1893.

Trifarina bradyi CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 4, p. 99, pl. 22, figs. 3–9, 1923; Carnegie Inst. Washington Publ. 342, p. 27, pl. 7, fig. 5, 1924.—YABE and HANZAWA, Jap. Journ. Geol. Pal., vol. 4, p. 50, 1925 (1926).—HANZAWA, Jap. Journ. Geol. Pal., vol. 4, p. 41 (table), 1925 (1926).—CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 1, pt. 4, p. 86, 1926.—CHAPMAN and PARR, Journ. Linn. Soc. Zool., vol. 36, p. 386, pl. 20, fig. 52, 1926.—CUSHMAN, Contr. Cushman Lab. Foram. Res., vol. 5, p. 96, pl. 13, fig. 39, 1929; Cushman Lab. Foram. Res. Special Publ. No. 4, pl. 22, fig. 15, 1933; No. 5, pl. 28, figs. 15*a–c*, 1933; B. P. Bishop Mus. Bull. 119, p. 127, pl. 15, fig. 11, 1934.—PALMER and BERMUDEZ, Mem. Soc. Cubana Hist. Nat., vol. 10, p. 293, 1936.—CHAPMAN and PARR, Australasian Antarctic Exped., ser. C., vol. 1, pt. 2, p. 98, 1937.—OVEY, Journ. Roy. Micr. Soc., vol. 47, p. 121, 1937.—ASANO, Journ. Geol. Soc. Japan, vol. 45, No. 538, p. 615, pl. 17 (6), fig. 25, 1938.

Test elongate, slightly tapering toward either end, often somewhat twisted, triangular in transverse section, with carinae at three angles, thin and fairly high, running from the initial end to the aperture, even onto the neck itself; chambers distinct, those of the earlier portion at least irregularly spiral, later ones less distinctly so; sutures distinct but not depressed; wall thin, translucent, finely punctate, smooth; aperture terminal, central, at the end of a short tubular neck, usually with a phialine lip. Length, 0.40 mm.; breadth, 0.18 mm.

This species is widely distributed both in the Atlantic and Pacific. It is possible that the Pacific form may be distinguished from the Atlantic one, the latter having the sides more concave and the carinae at the angles higher and more prominent with a thinner keel while it is less distinctly perforate. This is not the same as d'Orbigny's *Vaginulina tricarinata*, which is a peculiar form with the aperture at one angle. This species occurs most abundantly in deep water, as will be seen by the data of the long list of *Albatross* stations given in table 29. Besides these, specimens have occurred in 12 fathoms off Nairai, Fiji; 12 fathoms off Levuka, Fiji; and in 7 fathoms off Rotonga.

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TABLE 29.—*Trifarina bradyi—material examined*

U.S.N.M. No.	Number of specimens	Albatross station	Locality	Depth	Bottom temperature	Character of bottom	Occurrence
				Fathoms	°F.		
27422	1	H3798	Cape Martin, Nukuhiva Island, N. 30° E., dist. 6½ miles.	687	39.5	drab. vol. oz. glob.	Rare.
27423	1	H3810	Entrance to Avatoru Pass, Rahiroa Atoll, 3.5 miles S.	661	------	wh. co. s. glob. oz. min. frag.	Do.
27424	1	H3814	Lat. 15°14′10″ S., long. 147° 51′05″ W.	391	------	wh. co. s. sh. glob.	Do.
27425	8	H3840	Lat. 17°21′00″ S., long. 149° 15′00″ W.	1,585	------	vol. m----------	Common.
27426	3	H3841	Point Venus, Tahiti Island, S. 32°, 4.2 miles W.	775	------	crs. vol. s. mang. nod.	Rare.
27427	1	H3849	Village west side of Niau Atoll, 1.75 miles NE.	491	------	co. s. pter. oz------	Do.
27428	1	H3873	Southwest point of Tahanae, N. 68°, 4 miles E.	966	------	glob. oz. mang----	Do.
27429	2	H3889	Southwest face of Taenga Atoll, N. 67°, 3 miles E.	928	36.5	glob. pter. oz------	Do.
27430	1	H3890	Lat. 16°25′00″ S., long. 143° 33′00″W.	1,108	36.1	glob. oz. mang----	Do.
27431	1	H3900	Midway between Hikueru and Marokau.	1,372	35.7	glob. oz.. --------	Do.
27432	4	H3901	Northwest point of Marokau, 8 miles E.	1,620	35.6	glob. oz. mang----	Few.
27433	1	H3910	Southwest point of Aki Aki, 1 mile E.	377	43.0	co. s----------	Rare.
27434	1	H3936	Hereheretue Atoll, 0.3 mile E.	189	62.1	co. s. mang. part	Do.
27435	1	H3937	Hereheretue Atoll, 5.3 miles SE.	1,688	35.3	lt. br. glob. oz. mang. part.	Do.
27436	1	H3945	Northeast point of Murea Island, 5 miles SW.	981	36.7	crs. vol. s. pter----	Do.
27437	1	H3954	West end of Nomuka Island, N. 33°, 6 miles E.	600	39.2	co. s. pum. pter. oz.	Do.
27438	3	H3961	Center of south coast of Tarawa, 10 miles N.	413	43.5	crs. br. glob. oz ---	Do.
27439	2	H3978	Wotju Island, Elmore Atoll, 6 miles SE.	1,068	36.5	co. s----------	Rare.
27440	2	H3996	North point of Arhno Atoll, S. 50°, 7 miles E.	1,325	36.0	crs. glob. oz ------	Do.
27441	1	H3997	Southwest point of Arhno Atoll, 6 miles NE.	1,253	36.0	glob. oz----------	Do.

Genus SIPHONODOSARIA A. Silvestri, 1924

Siphonodosaria A. SILVESTRI, Boll. Soc. Geol. Ital., vol. 42, p. 18, 1923 (1924).

Genotype.—By designation, *Nodosaria abyssorum* H. B. Brady.

Test elongate; chambers in a rectilinear uniserial arrangement, inflated, proloculum often larger than following chambers; wall calcareous, perforate; aperture large, rounded, with neck and lip. Tertiary, Recent.

SIPHONODOSARIA (?) sp. (?)

PLATE 15, FIGURE 14

There is a single specimen from *Albatross* station H3920 figured on our plate that may belong to this genus. More specimens must be available before its full characters can be definitely known.

EXPLANATION OF PLATES

PLATE 1

FIGURES 1–4. *Bolivinita quadrilatera* (Schwager). × 50. Fig. 1, Young specimen. Fig. 2, Adult: *a*, Front view; *b*, side view; *c*, apertural view. *Albatross* H3843. Fig. 3, *a*, Front view; *b*, apertural view. Fig. 4, *a*, Front view; *b*, side view; *c*, apertural view. *Albatross* H3841.

PLATE 2

(In all cases: *a*, Front view; *b*, apertural view)

FIGURES 1–4, 6. *Bolivinella folia* (Parker and Jones). × 70. Figs. 1, 2, Mokaujar Anchorage, Fiji. Figs. 3, 4, 6, Makemo Lagoon.

5, 8. *Bolivinella folia* (Parker and Jones) var. *ornata* Cushman. × 70. Levuka, Fiji.

7*a*, *b*. *Bolivinella margaritacea* Cushman. × 70. Rutavu.

9, 10. *Nodogenerina* (?) *milletti* Cushman. × 70. Guam Anchorage, Ladrone Islands.

11*a*, *b*. *Nodogenerina* (?) *spinata* Cushman. × 40. *Albatross* H3866.

PLATE 3

FIGURES 1–4. *Buliminella milletti* Cushman. × 70. Figs. 1, 2, 4, Mokaujar Anchorage. Fig. 2, *a*, Front view; *b*, apertural view. Fig. 3, Niau Lagoon.

5, 6. *Buliminella madagascariensis* (d'Orbigny) var. *spicata* Cushman and Parker, new name. × 70. Off Fiji, 40–50 fathoms. Fig. 5, *a*, Front view; *b*, apertural view.

7–9. *Buliminoides williamsoniana* (H. B. Brady). × 70. Levuka, Fiji. Fig. 8, *a*, Front view; *b*, apertural view.

10, 11. *Bulimina fijiensis* Cushman. × 70. Fig. 10, Nairai, Fiji. *a*, Front view; *b*, side view; *c*, apertural view. Fig. 11, Levuka, Fiji. *a*, Front view; *b*, apertural view.

12*a*, *b*. *Bulimina rostrata* H. B. Brady. × 70. *Albatross* H3900. *a*, Front view; *b*, apertural view.

13*a*, *b*. *Bulimina elongata* d'Orbigny var. *subulata* Cushman and Parker. × 75. *Albatross* H3977. *a*, Front view; *b*, apertural view.

14*a*, *b*. *Robertina subcylindrica* (H. B. Brady). × 50. *Albatross* H3858. *a*, Front view; *b*, end view.

Plate 4

(In all cases: *a*, Front view; *b*, side view; *c*, apertural view)

Figures 1*a–c*. *Virgulina schreibersiana* Czjzek. × 50. Port Lotten, Kersaint, Caroline Islands.
2–5. *Virgulina complanata* Egger. × 50. Fig. 2, *Albatross* H3903. Figs. 3, 4, *Albatross* H3838. Fig. 5, *Albatross* H3798.
6*a–c*. *Virgulina fijiensis* Cushman. × 50. Nairai, Fiji.

Plate 5

Figures 1–3. *Virgulina pauciloculata* H. B. Brady. Fig. 1, × 50. Viva Anchorage, Fiji. *a*, Front view; *b*, side view; *c*, apertural view. Figs. 2, 3, × 55. Off Niau. *a*, Front view; *b*, side view; *c*, apertural view.
4 *a*, *b*. *Bolivina vadescens* Cushman. × 55. Nairai, Fiji. *a*, Front view; *b*, apertural view.
5–8. *Bolivina hantkeniana* H. B. Brady. × 55. *Albatross* H3840. Fig. 7, *a*, Front view; *b*, apertural view.

Plate 6

Figures 1 *a*, *b*. *Bolivina spinea* Cushman. × 55. Fiji. *a*, Front view; *b*, apertural view.
2 *a*, *b*. *Bolivina robusta* H. B. Brady. × 55. *Albatross* H3883. *a*, Front view; *b*, apertural view.
3, 4. *Bolivina subangularis* H. B. Brady. × 75. Viva Anchorage, Fiji. Fig. 3, *a*, Front view; *b*, side view; *c*, apertural view.
5, 6. *Bolivina subangularis* H. B. Brady var. *lineata* (Cushman). × 50. Levuka, Fiji.
7, 8. *Bolivina rhomboidalis* (Millett). × 75. Rangiroa. Fig. 7, *a*, Front view; *b*, side view; *c*, apertural view.

Plate 7

(In all cases: *a*, Front view; *b*, apertural view)

Figures 1 *a*, *b*. *Bolivina tortuosa* H. B. Brady. × 55. Fiji.
2, 3. *Bolivina compacta* Sidebottom. × 55. Fig. 2, Near Nairai, Fiji. Fig. 3, *Albatross* H3954.
4 *a*, *b*. *Bolivina oceanica* Cushman. × 55. *Albatross* H3838.
5 *a*, *b*. *Bolivina nitida* H. B. Brady. × 55. *Albatross* H3989.
6. *Bolivina seminuda* Cushman. × 55. *Albatross* H3804.
7. *Bolivina spinescens* Cushman. × 55. *Albatross* H3829.

Plate 8

(In all cases: *a*, Front view; *b*, apertural view)

Figures 1–3. *Bolivina capitata* Cushman. Fig. 1, × 50. Nairai, Fiji. Figs. 2, 3, × 55. Fig. 2, Levuka, Fiji. Fig. 3, Rotonga.
4 *a*, *b*. *Bolivina globulosa* Cushman. × 55. *Albatross* H3881.
5. *Bolivina subtenuis* Cushman. × 55. Mokaujar Anchorage, Fiji.
6 *a*, *b*. *Bolivina pseudopygmaea* Cushman. × 55. *Albatross* H3989.

Plate 9

(In all cases: *a*, Front view; *b*, apertural view)

Figure 1. *Bolivina striatula* Cushman. × 40. Lagoon, Pinaki Atoll.
2. *Bolivina subreticulata* Parr. × 70. *Albatross* H3809.
3 *a*, *b*. *Bolivina variabilis* (Williamson). × 40. *Albatross* H3905.
4 *a*, *b*. *Bolivina* cf. *paula* Cushman and Cahill. × 55. Makemo Lagoon, Paumotu Islands.
5 *a*, *b*. *Bolivina abbreviata* Heron-Allen and Earland. × 55. *Albatross* H3989.
6, 7. *Bolivina ligularia* Schwager. × 55. 6, *Albatross* H3829. 7, *Albatross* H3900.

Plate 10

Figure 1. *Loxostoma limbatum* (H. B. Brady). × 40. Levuka, Fiji. *a*, Front view; *b*, apertural view.
2–4. *Loxostoma limbatum* (H. B. Brady) var. *costulatum* (Cushman). Fig. 2, × 80. Nairai, Fiji. *a*, Front view; *b*, apertural view. Fig. 3, × 32. Guam Anchorage, Ladrone Islands. *a*, Front view; *b*, apertural view. Fig. 4, × 80. Levuka, Fiji. *a*, Front view; *b*, apertural view.
5. *Loxostoma lobatum* (H. B. Brady). × 130. *Albatross* H3870.
6. *Loxostoma convallarium* (Millett). × 95. 40–50 fathoms, off Fiji. *a*, Front view; *b*, apertural view.
7. *Loxostoma karrerianum* (H. B. Brady) var. *carinatum* (Millett). × 55. *Albatross* H3896.

Plate 11

(In all cases: *a*, Front view; *b*, apertural view)

Figures 1, 2. *Loxostoma mayori* (Cushman). × 40. Nairai, Fiji.
3, 4. *Loxostoma rostrum* Cushman. Fig. 3, × 85. *Albatross* H3945. Fig. 4, × 55. *Albatross* H3840.
5–8. *Reussella spinulosa* (Reuss). × 40. Rongelab Atoll, Marshall Islands.

Plate 12

Figures 1–5. *Trimosina orientalis* Cushman. × 70. Figs. 1, 4, 5, Nairai, Fiji. *a*, *a*, Front views; *b*, *b*, apertural views. Fig. 2, Rotonga. *a*, Front view; *b*, side view; *c*, apertural view. Fig. 3, Vavau Anchorage, Fiji. *a*, Front view; *b*, apertural view.
6. *Trimosina perforata* Cushman. × 60. 40–50 fathoms, off Fiji. *a*, Front view; *b*, apertural view.
7. *Trimosina simplex* Cushman. × 60. 40–50 fathoms, off Fiji. *a*, Front view; *b*, apertural view.
8. *Mimosina pacifica* Cushman. × 70. Levuka, Fiji. *a*, Front view; *b*, apertural view.

Plate 13

(In all cases: *a*, Front view; *b*, apertural view)

Figure 1. *Chrysalidinella dimorpha* (H. B. Brady). × 60. 40–50 fathoms, off Fiji.

2–6. *Uvigerina ampullacea* H. B. Brady. Fig. 2, × 50. *Albatross* H3980. Fig. 3, × 55. *Albatross* H3991. Fig. 4, × 55. *Albatross* H3883. Fig. 5, × 50. *Albatross* H3798. Fig. 6, × 55. *Albatross* H3857.

7, 8. *Uvigerina porrecta* H. B. Brady. × 55. Levuka, Fiji.

9, 10. *Uvigerina porrecta* H. B. Brady, var. *fimbriata* Sidebottom. × 70. 40–50 fathoms, off Fiji.

Plate 14

(In all cases: *a*, Front view; *b*, apertural view)

Figures 1–4. *Uvigerina proboscidea* Schwager. × 50. Fig. 1, *Albatross* H3974. Fig. 2, *Albatross* H3969. Fig. 3, *Albatross* H3924. Fig. 4, *Albatross* H3798.

5–9. *Uvigerina proboscidea* Schwager var. *vadescens* Cushman. × 70. Fig. 5, Guam Anchorage, Ladrone Islands. Fig. 6, *Albatross* H3996. Figs. 7, 9, *Albatross* H3840. Fig. 8, Nairai, Fiji.

Plate 15

(In all cases: *a*, Front view; *b*, apertural view)

Figure 1. *Hopkinsina pacifica* Cushman. × 120. Vavau Anchorage, Tonga Islands.

2, 3. *Siphogenerina virgula* (H. B. Brady). × 25. Nairai, Fiji.

4. *Siphogenerina dimorpha* (Parker and Jones) var. *pacifica* Cushman. × 32. *Albatross* H3974.

5. *Siphogenerina columellaris* (H. B. Brady). × 25. *Albatross* H3840.

6–9. *Siphogenerina raphana* (Parker and Jones). Figs. 6, 7, × 32. Nairai, Fiji. Figs. 8, 9, × 25. *Albatross* H3843.

10, 11. *Angulogerina albatrossi* Cushman var. *ornata* Cushman. × 40. *Albatross* H3989.

12. *Angulogerina occidentalis* (Cushman). × 70. *Albatross* H3838.

13. *Trifarina bradyi* Cushman. × 70. Nairai, Fiji.

14. *Siphonodosaria* (?) sp. (?) × 70. *Albatross* H3920.

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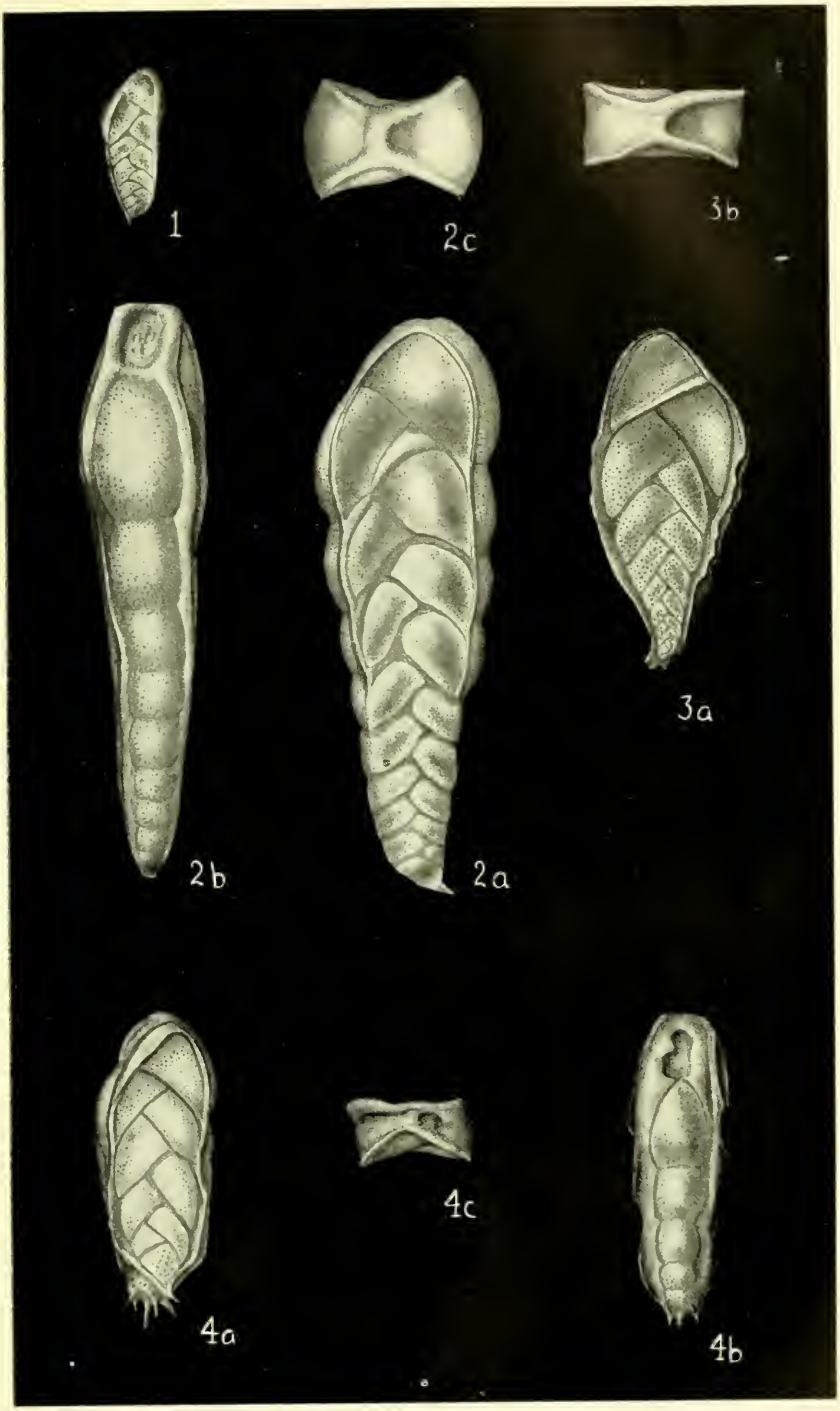

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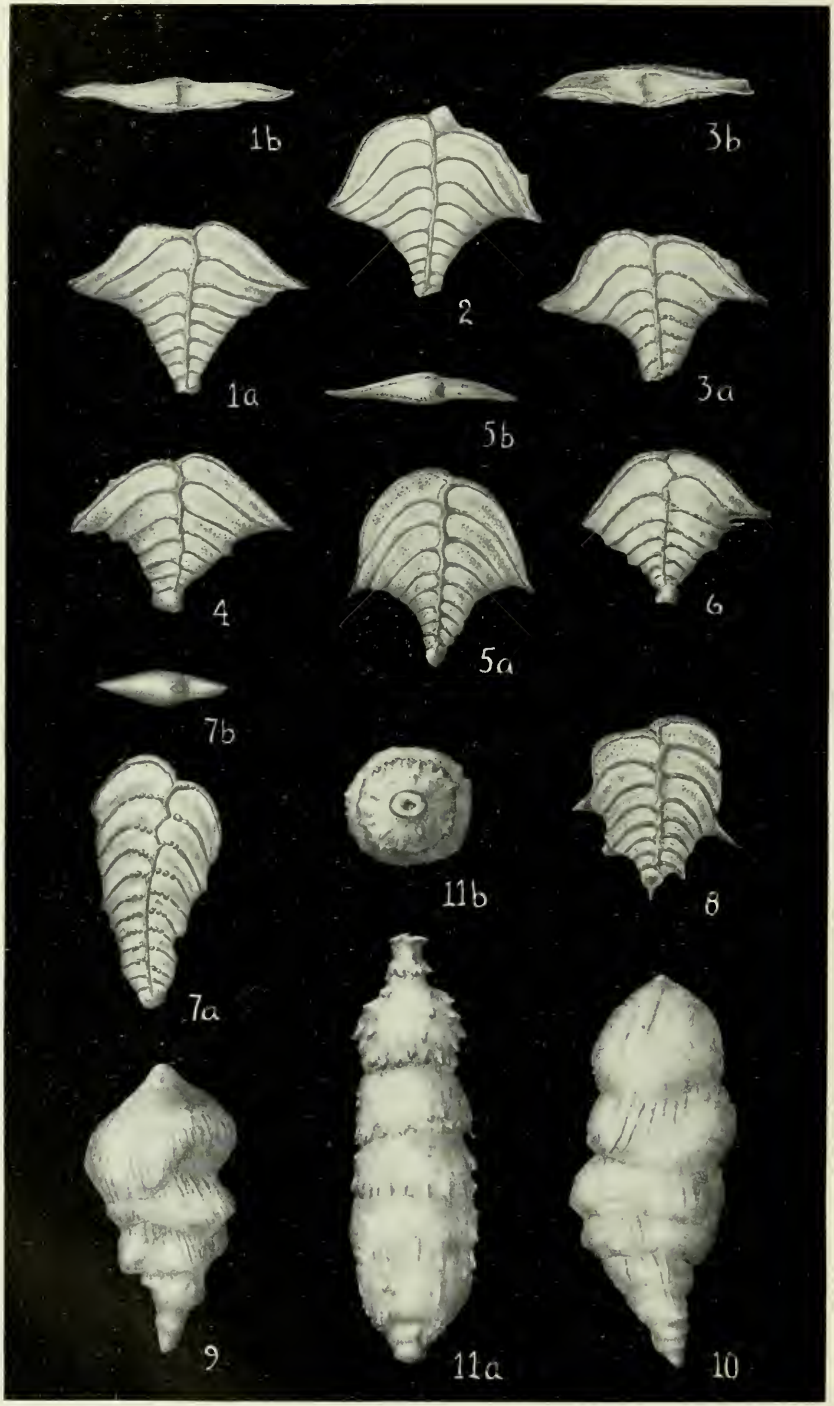

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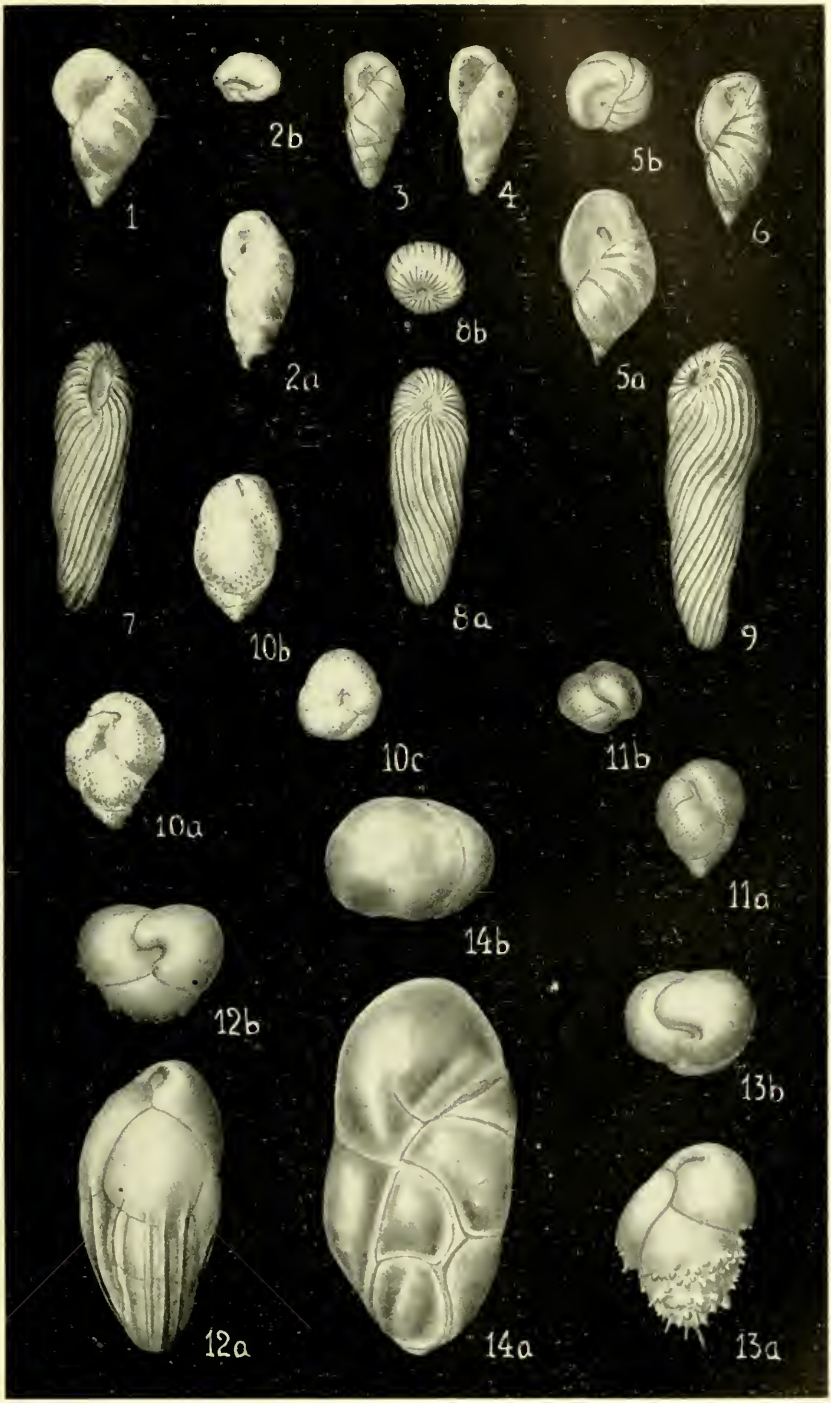

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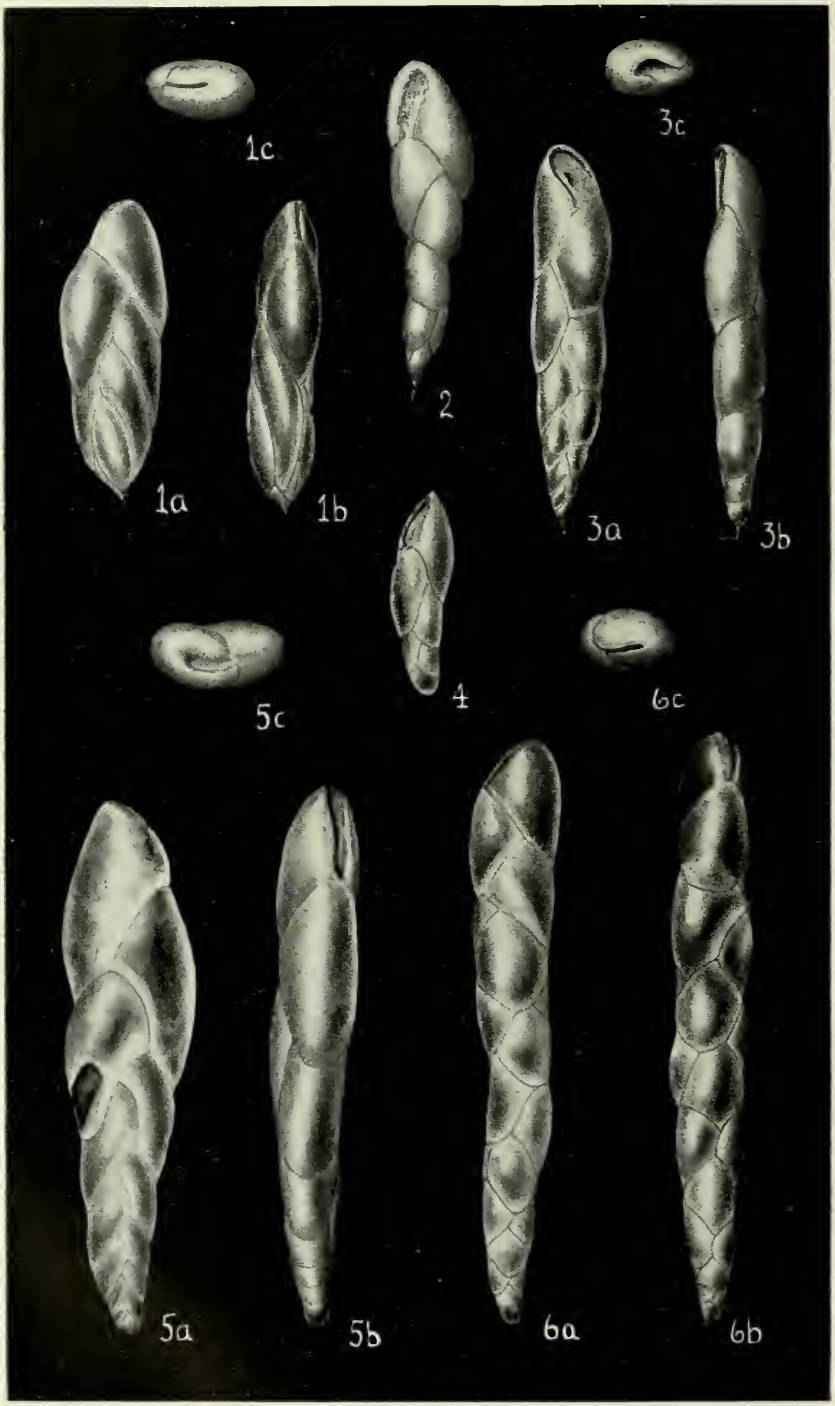

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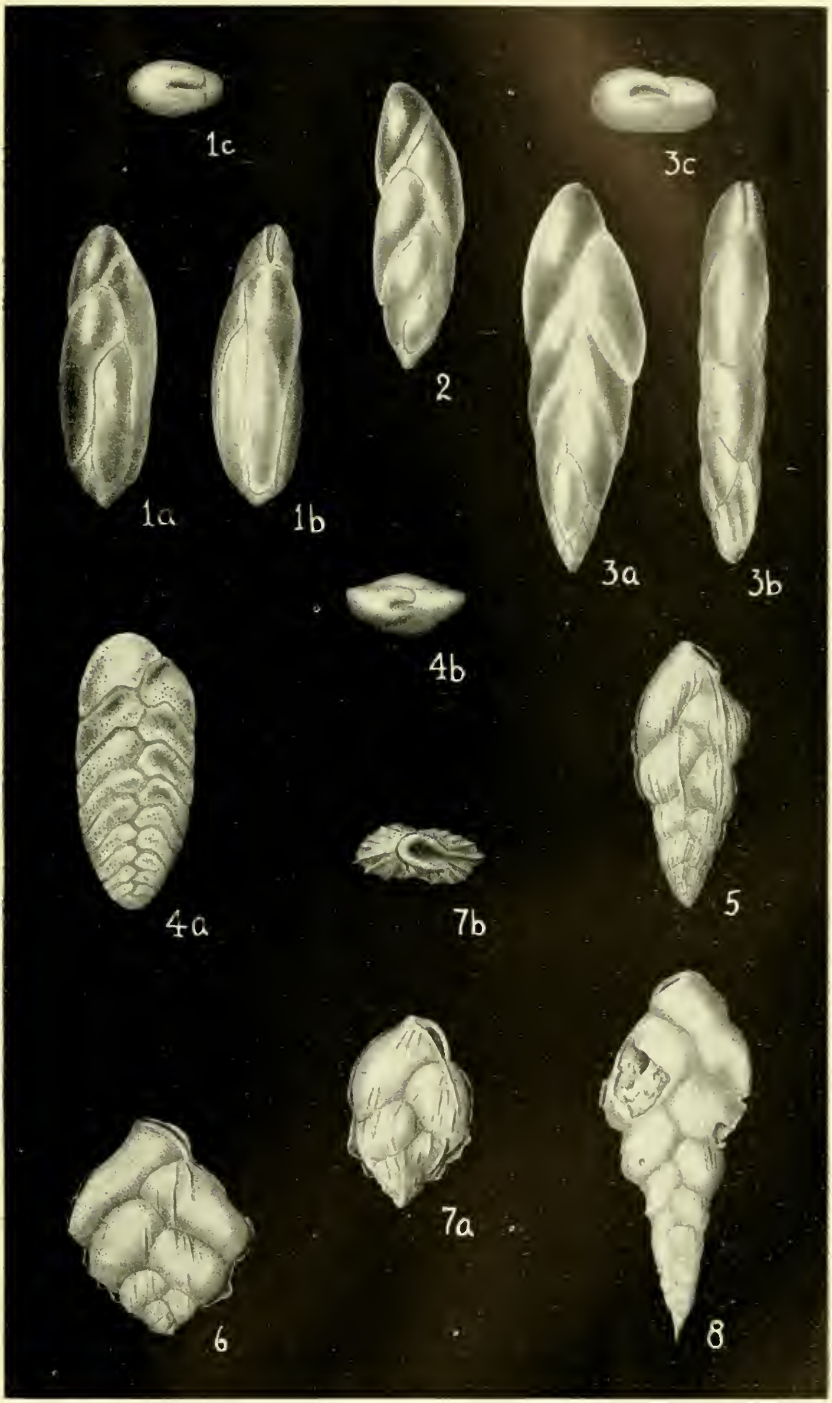

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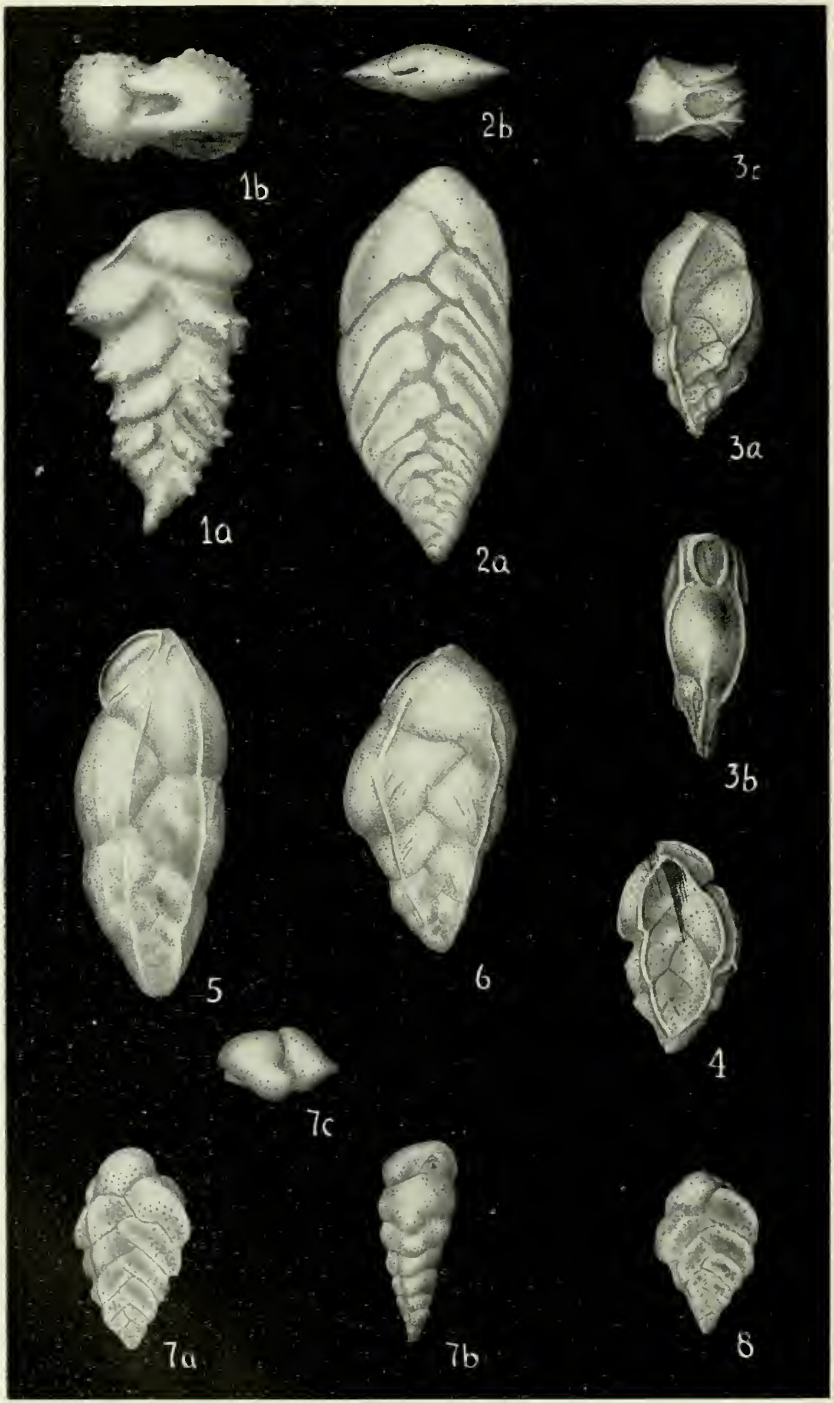

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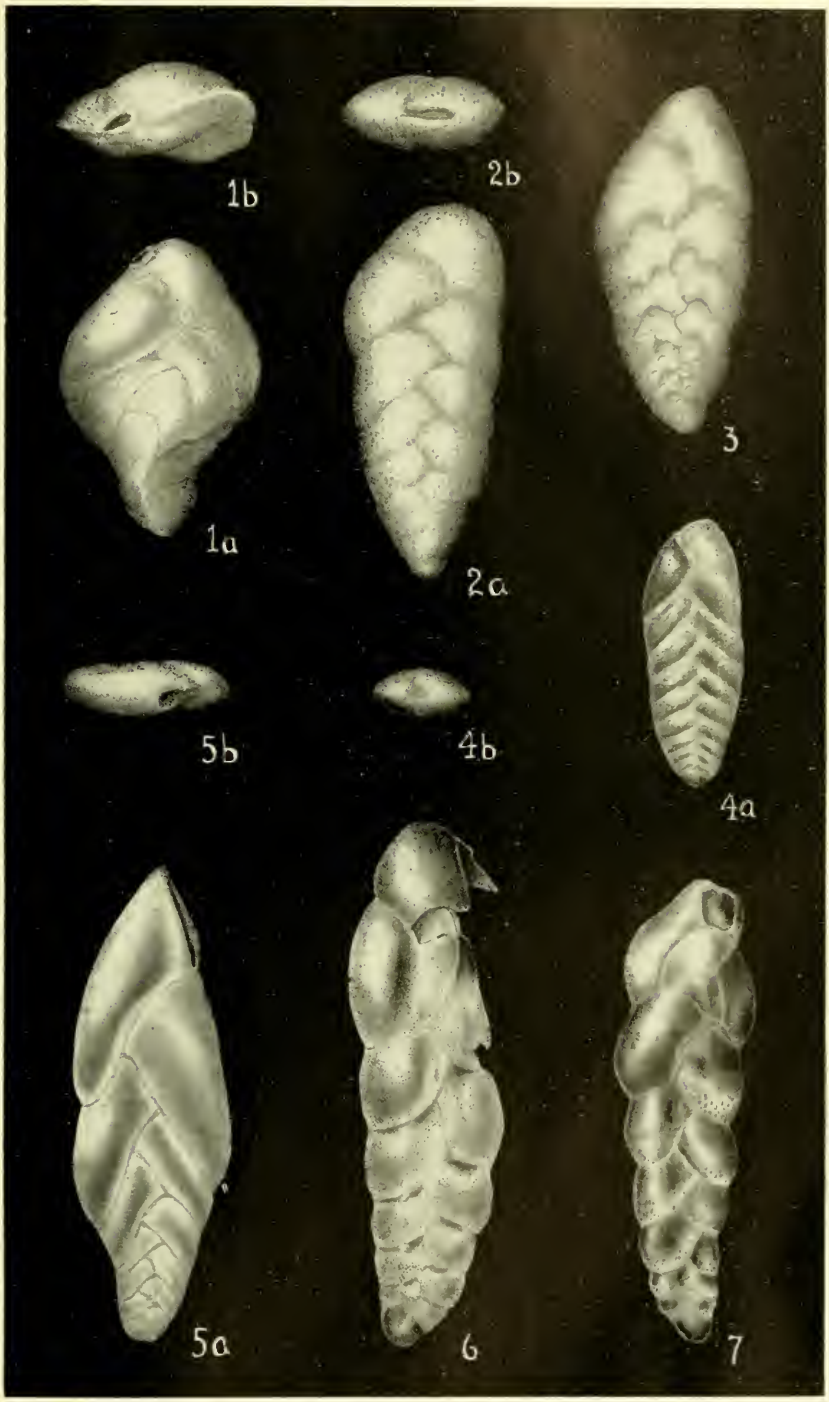

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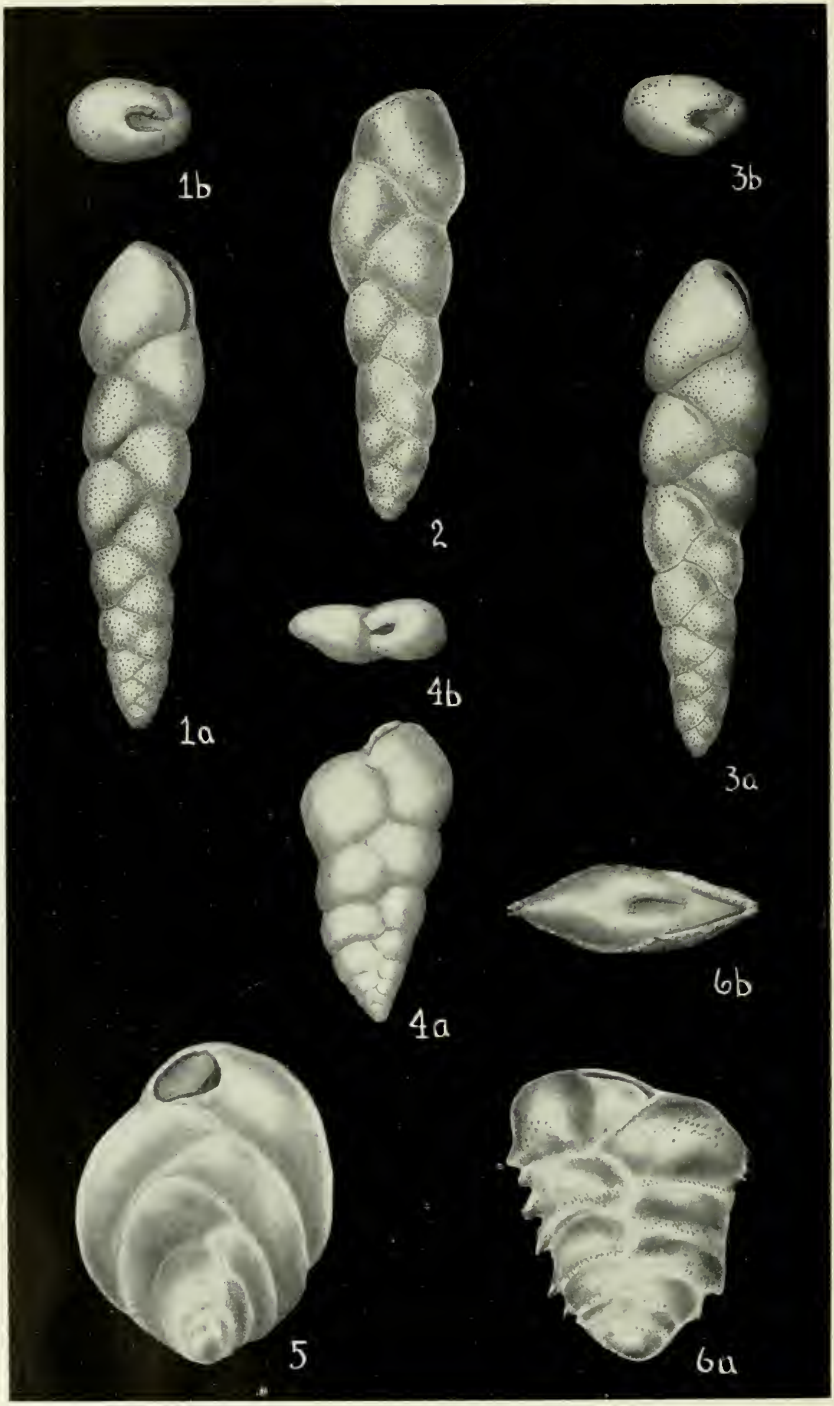

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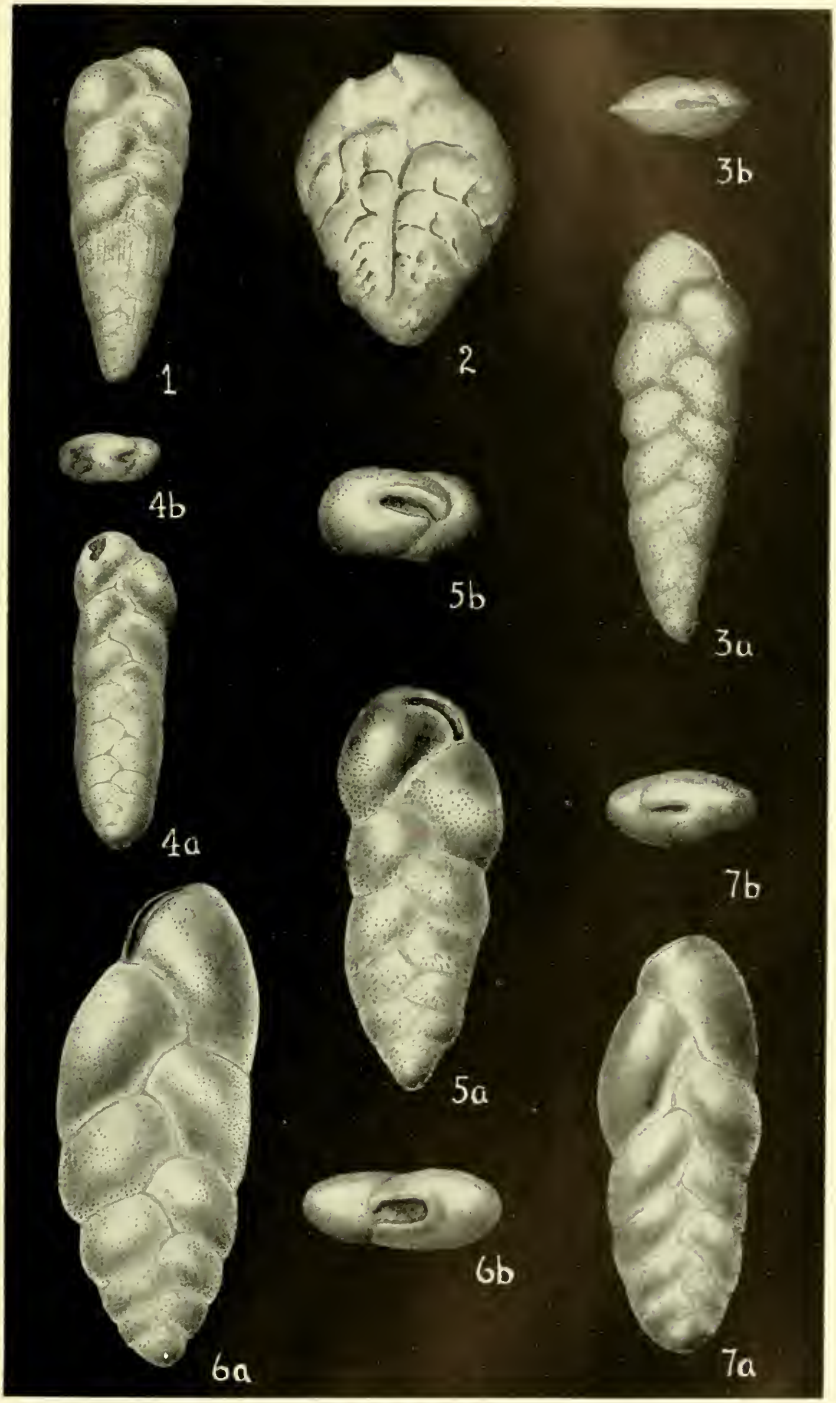

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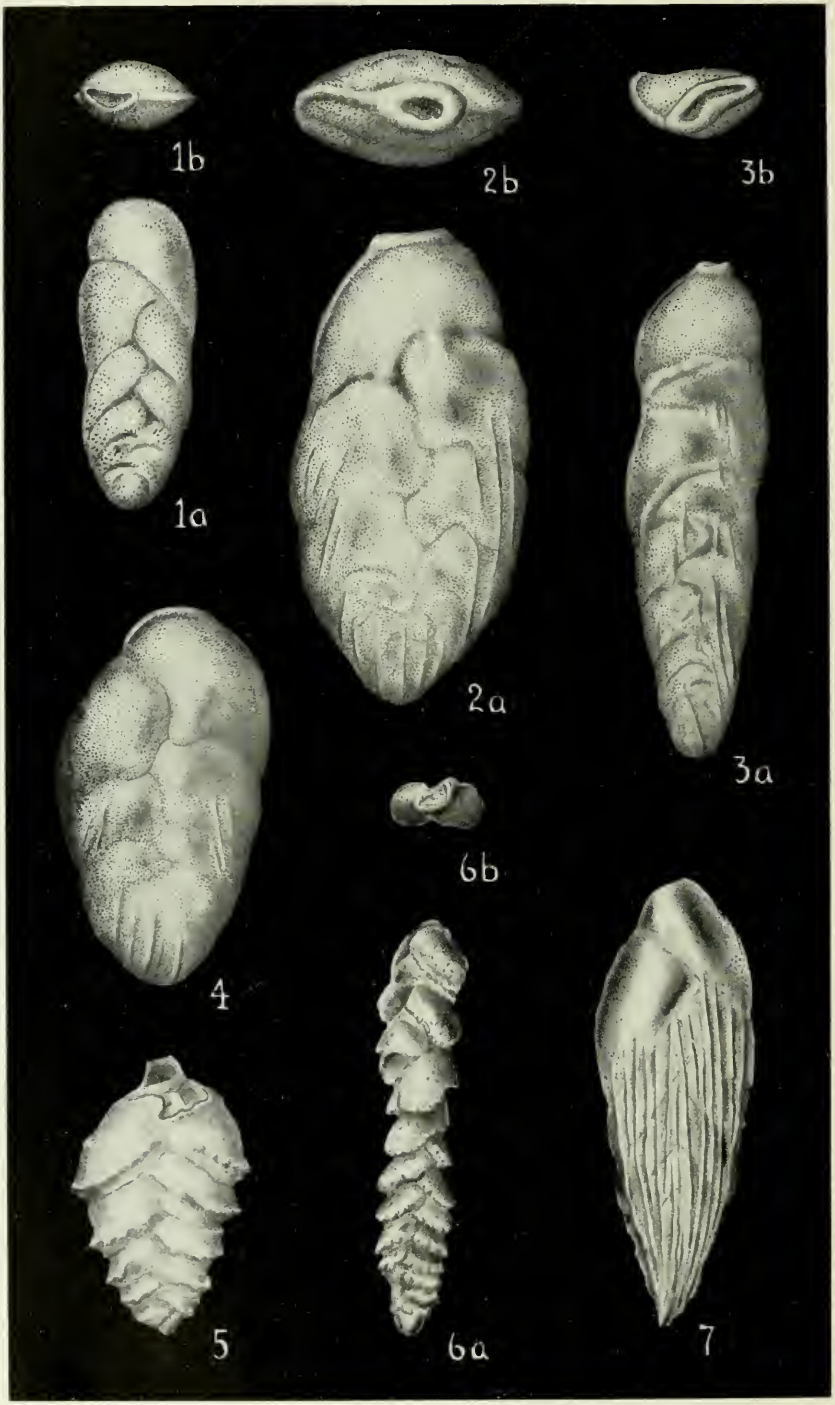

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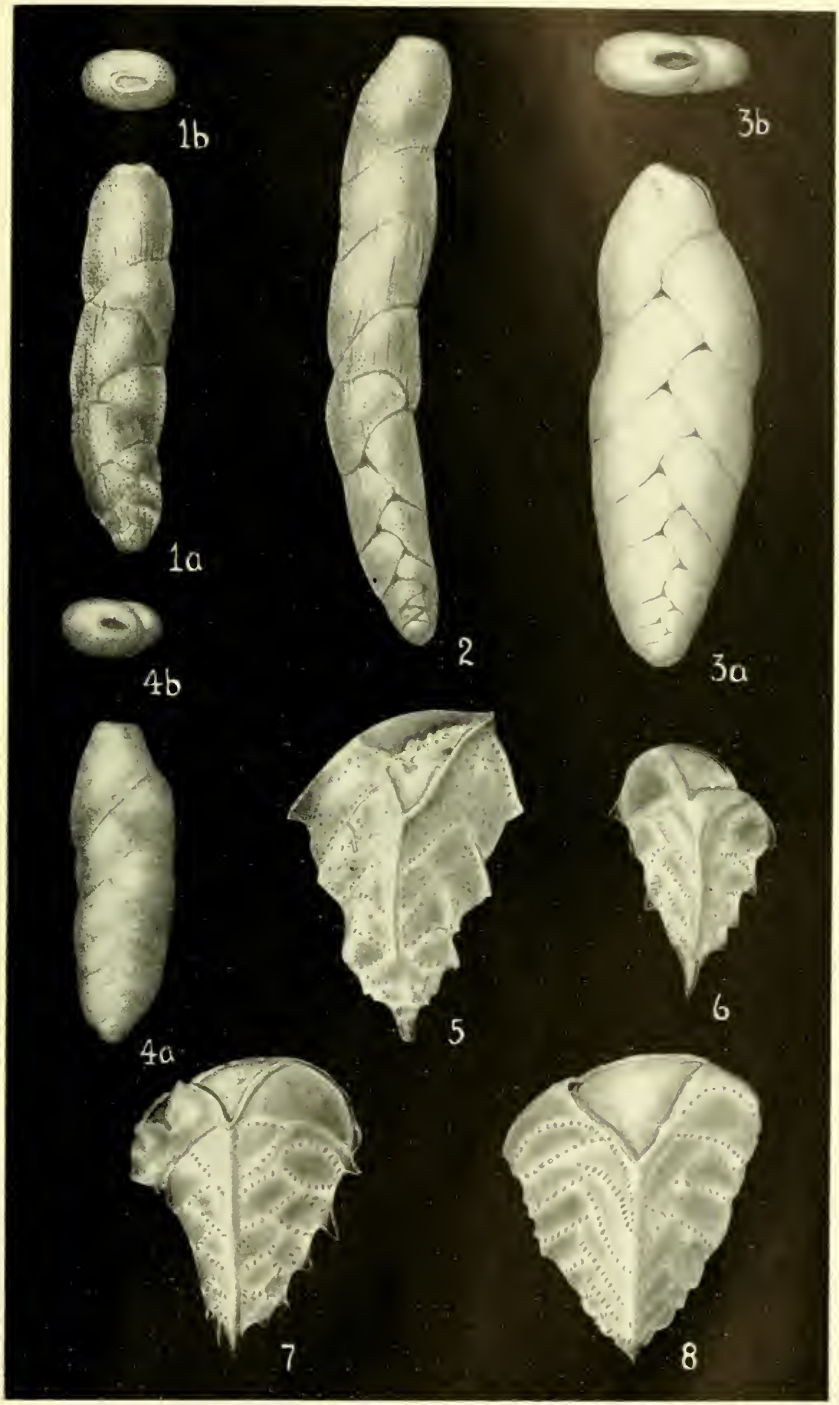

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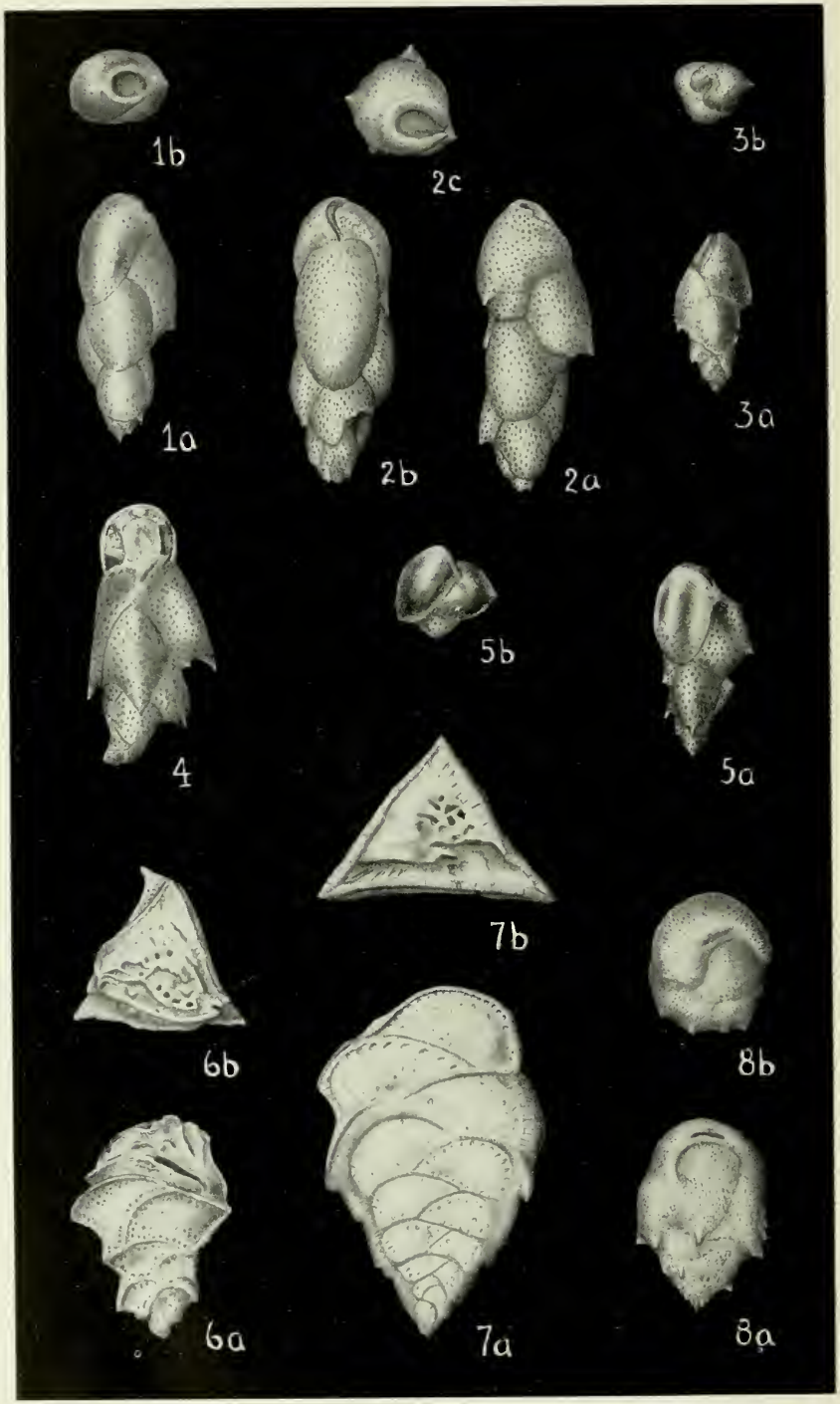

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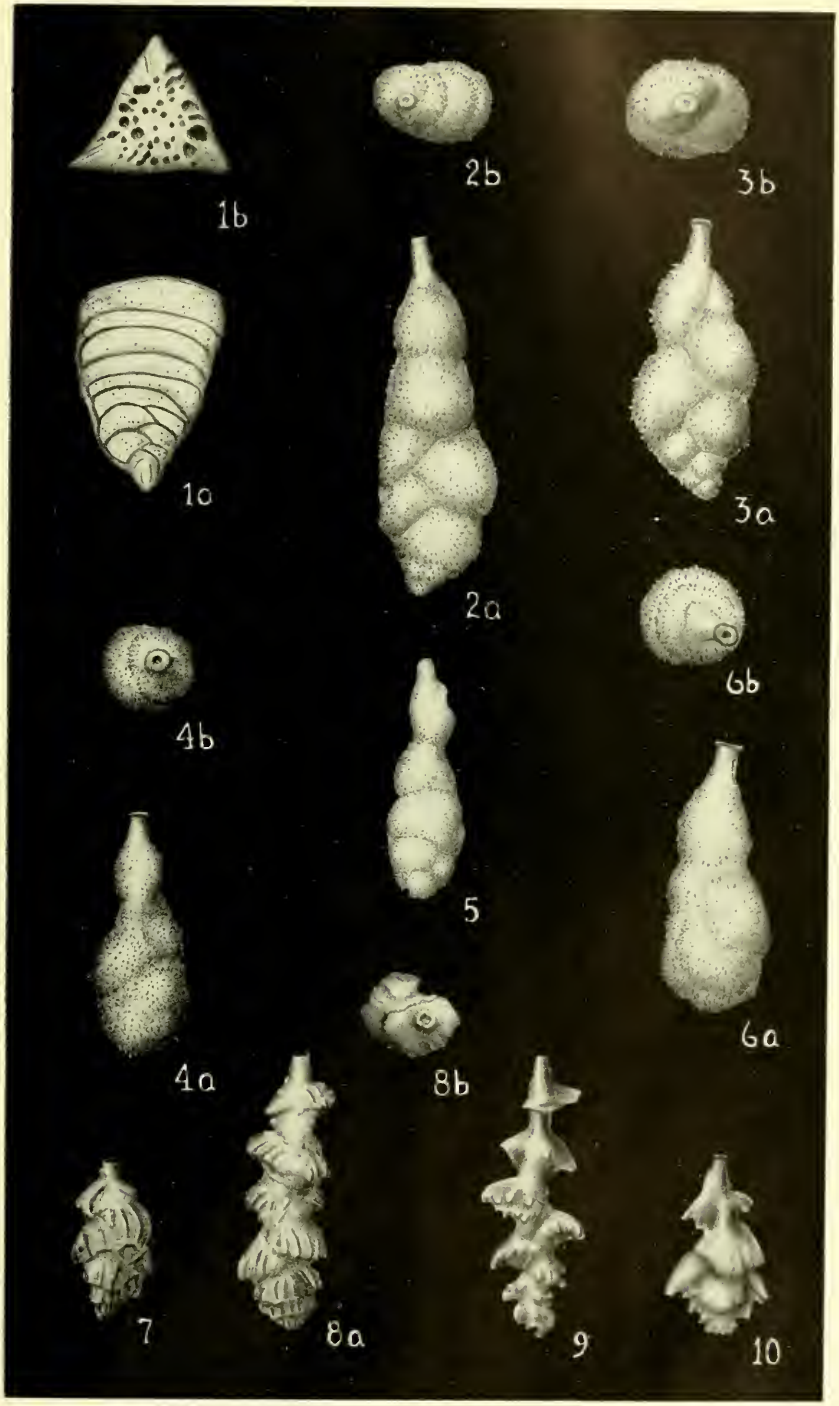

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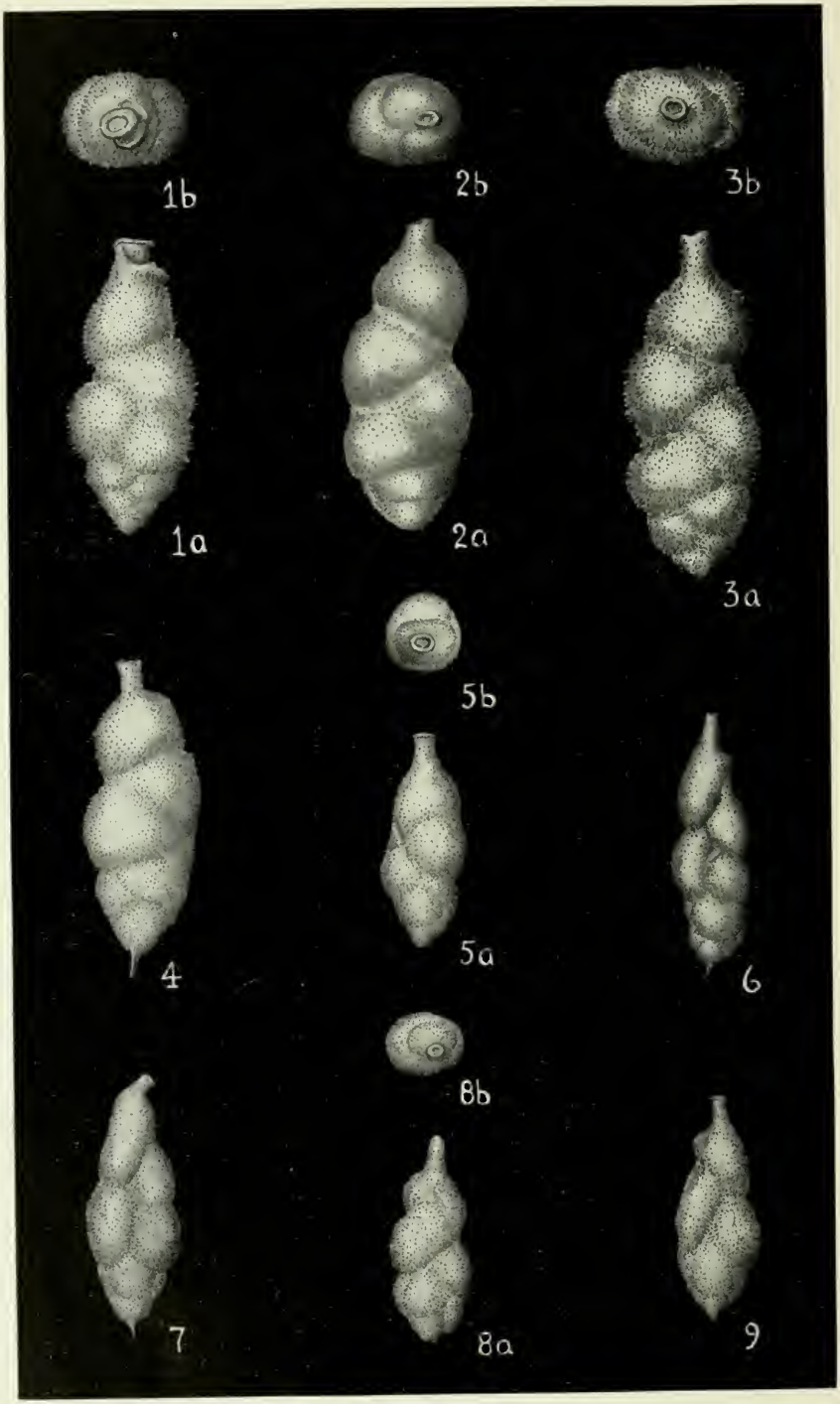

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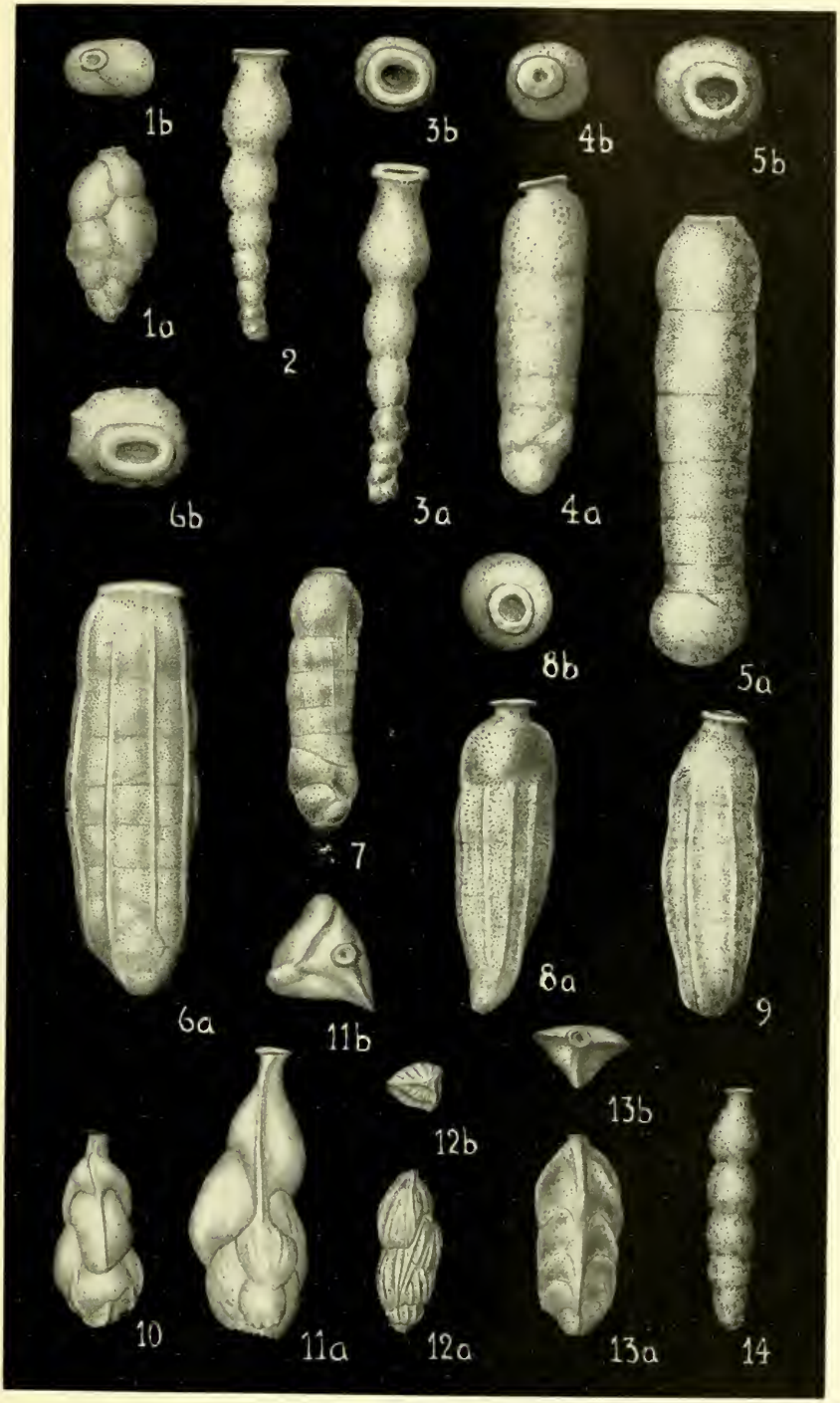

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